



And Maintenance Manual

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## **Chapter 1. Introduction**

## A. Why an Operation and Maintenance Manual?

This manual was developed to help owners and operators of Underground Storage Tank (UST) systems understand and organize all of the operation and maintenance requirements that need to be done on a routine basis.

The passing of the December 22, 1998 deadline gave a number of people in the UST community the impression that the work to meet compliance was essentially over. Many thought that a recently installed or upgraded UST would provide a problem-free future for UST systems in North Carolina.

But the work is far from over. While owners and operators throughout North Carolina spent the 1990's achieving compliance with the 1998 upgrade requirements, many have not considered how to maintain compliance. Many owners and operators are unaware of the annual, monthly and even daily requirements needed to operate a UST system that is free of leaks, overfills, and corrosion. Without routine maintenance for identifying and correcting problems, it may only be a matter of time before your UST system fails.

This manual was designed to help meet the challenge of maintaining compliance. The UST system operation and maintenance requirements are organized into a simple, easy to read booklet.

## **B.** Benefits of Using This Manual

- Identify the things you must do on a routine basis to make sure your UST system is functioning properly.
- Organize and put in one place a series of checklists with all of your operation and maintenance duties.
- Train yourself and your employees on how to effectively operate and maintain your UST system.
- Save time, money, and resources by being an informed UST owner or operator.
- Discover small problems before they turn into large ones.
- Prepare for UST compliance inspections.
- Protect your investment by extending the life of your UST system using preventative maintenance.
- Avoid fines, penalties, and enforcement actions.

## C. Who Should Read This Manual?

- UST owners and operators.
- Any UST-facility employees who use or manage USTs.
- People who are considering the purchase or installation of an UST.

## D. How to Use This Manual

- Facility Summary After you finish the introductory chapter, proceed to Chapter 2 and fill out all the information about your particular UST facility. This will help you determine the other chapters that apply to your situation.
- Read Each Chapter Carefully read each of the following chapters that apply to you.
   Pay special attention to the checklists and use them to see if you are operating and maintaining your UST facility properly.
- Notes/Problems/Questions At the end of each chapter, make a list of questions or concerns you have. Contact NCDEQ UST Section for assistance (see Chapter 9 for details). If you come across a term that is unfamiliar to you, a glossary of terms has been included for your convenience (see Chapter 10).
- **Emergency Information** Chapter 4 deals with what to do when you have a known or suspected release of petroleum. Fill out the Emergency Contact page and post it at the UST facility where staff can easily see it.
- Annual Review You and your employees should review this manual once a year or whenever you may have questions about operating and maintaining UST systems.



If you have questions, don't hesitate to call us at the UST Section Central Office (919) 707-8171.

# Chapter 2. Identifying the Equipment at Your UST Facility

## A. Getting Started

Before you learn about your specific operation and maintenance requirements, you need to know what type of UST system you have. Use this chapter to document the three major areas of prevention equipment at your UST system: release detection, spill and overfill prevention and corrosion protection. Once you are sure you know what you have, then read and answer the questions on all the following pages that apply.



## B. UST Equipment Checklist (Table 2)

Use Table 2 as a starting point to see if you have the right equipment. Take a few minutes and place a check beside the equipment that you have at your UST facility for each of your tanks. If you have more than one UST facility, feel free to make additional copies of the checklist.

If you are not sure about your equipment, or how to complete the checklists, **do not guess**. It is important to know exactly what you have, otherwise you will not be able to properly operate and maintain your system. Your UST equipment contractor should be able to help you identify what types of release detection, spill control, overfill prevention and corrosion protection equipment that you have. You may also contact a NCDEQ UST inspector for assistance in filling out this form. (For inspector contact information, please call 919-707-8171)



If you do not know the type of equipment you have at your UST facility, you run the risk of not being able to maintain and operate your equipment properly.

Worse yet, you may not be able to determine if your equipment is working properly or if your system is leaking.

### **Table 1 - UST Equipment Checklist General Facility Information Facility Name** Facility ID # Release Detection (See Chapter 3 for information on release detection) A. Release Detection for Tanks Check at least one for each tank (or tank compartment): Tank #1 Tank #2 Tank #3 Tank #4 Automatic Tank Gauging (ATG) System Statistical Inventory Reconciliation (SIR) Secondary Containment with Interstitial Monitoring **Groundwater Monitoring** Vapor Monitoring Inventory Control and Tank Tightness Testing (TTT)\* Manual Tank Gauging Only \*\* Manual Tank Gauging and Tank Tightness Testing (TTT)\*\*\* Allowed only for 10 years after upgrading or installing tank with corrosion protection. TTT required every 5 years. Allowed only for tanks of 550 gallon capacity or less. \*\*\* Allowed only for tanks of 2,000 gallon capacity or less and only for 10 years after upgrading or installing tank with corrosion protection. TTT required every 5 years. B. Release Detection for Pressurized Piping Check at least one from A and one from B for each tank's Tank #1 Tank #2 Tank #3 Tank #4 piping: Automatic Flow Restrictor (common with Mechanical Line Leak Detectors) (common with Electronic (Automatic **Automatic Shutoff Device** Line Leak Detectors) Line Leak **Detectors**) (common with Electronic Continuous Alarm Line Leak Detectors) Annual Line Tightness Test В Monthly Monitoring\* (please specify) Monthly Monitoring for piping includes Interstitial Monitoring, SIR, Electronic Line Leak Detectors, Vapor Monitoring and Groundwater Monitoring) C. Release Detection for Suction Piping Check at least one for each tank's piping: Tank #1 Tank #2 Tank #3 Tank #4 **Line Tightness Testing Every Three Years** Monthly Monitoring\* (please specify) No Release Detection Required For "Safe Suction" \*\* Monthly Monitoring for piping includes Interstitial Monitoring, Vapor Monitoring, Groundwater Monitoring, and No release detection is required if it can be verified by a UST equipment contractor and documented on a UST-19 Form that you have a "safe suction" (also known as "European" suction) piping system with the following characteristics: 1) Only one check valve per line located directly below and as close as practical to the suction pump; 2) Piping sloping back to the tank; and 3) System operates below atmospheric pressure.

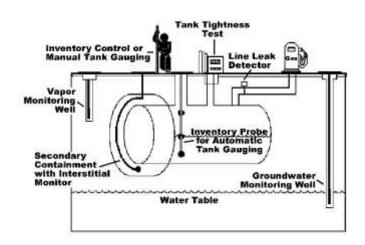
Table 1 - UST Equipme	ent Che	cklist		
Spill and Overfill Prevention (See Cha	pter 5 for	more info	ormation)	
Check for each tank:	Tank #1	Tank #2	Tank #3	Tank #4
Spill Catchment Basin (Spill Bucket)				
Check at least one overfill device for each tank:				
Automatic Shutoff Device (Flapper Valve)				
Overfill Alarm				
Ball Float Valve				
Corrosion Protection (See Chapter 6 for r	nore infor	mation)		
A. Corrosion Protection for Tanks				
Check at least one for each tank:	Tank #1	Tank #2	Tank #3	Tank #4
Coated and Cathodically Protected Steel (e.g., STI-p3 tank, sacrificial anodes or impressed current)				
Noncorrodible Material (e.g., fiberglass reinforced plastic)				
Steel Jacketed or Clad with Noncorrodible Material				
Noncoated Steel with Cathodic Protection (e.g., sacrificial anodes or impressed current)*				
Internally Lined Tank*				
Noncoated Steel with Cathodic Protection (e.g., sacrificial anodes or impressed current) and Internally Lined*				
*These options may be used only for tanks installed before Decemb	oer 22, 1988.			
B. Corrosion Protection for Piping		1		
Check at least one for each:	Tank #1	Tank #2	Tank #3	Tank #4
Coated and Cathodically Protected Steel (e.g., sacrificial anodes or impressed current)				
Noncorrodible Material (e.g., fiberglass reinforced plastic or flexible plastic)				
Noncoated Metal with Cathodic Protection (e.g., sacrificial anodes or impressed current)*				
* This option may be used only for piping installed before December	r 22, 1988.			
C. Corrosion Protection for Flex Connectors				
Check at least one for each tank system:	Tank #1	Tank #2	Tank #3	Tank #4
Cathodically Protected (e.g., sacrificial anodes)				
Flex Connectors Isolated from Soil (e.g., isolation boot, containment sump or soil completely removed from around flex connector)				
Note: UST piping systems that have flex connectors, generally have	e them locat	ed at the tar	ık and dispe	nser.

## **Chapter 3. Release Detection**

### A. What is Release Detection?

You must be able to determine at least every 30 days whether or not your tank and piping are leaking by using proper release detection methods. The release detection methods, vapor monitoring and groundwater monitoring, are special exceptions and must be monitored at least every 14 days. Be aware that the phrases "release detection" and "leak detection" are often used interchangeably.

Your release detection method must be able to detect a release from any portion of the tank and connected underground piping that routinely contains product.



Release detection must be installed, calibrated, operated, and maintained according to the manufacturer's instructions.

## B. What Types of Release Detection are there?

#### Tanks –

The three most common forms of release detection are:

- Automatic Tank Gauging (ATG) Systems
- Secondary Containment with Interstitial Monitoring
- Statistical Inventory Reconciliation (SIR)

Other methods, which have additional requirements, such as the length of time the method can be used or the maximum size of tank that a method can be used for, are:

- Groundwater Monitoring
- Vapor Monitoring
- Inventory Control and Tank Tightness Testing
- Manual Tank Gauging
- Manual Tank Gauging and Tank Tightness Testing

## Pressurized Piping -

The methods of release detection are:

 Automatic Line Leak Detector (capable of detecting a 3.0 gallon per hour catastrophic leak)

#### -Plus one of the following-

- Annual Line Tightness Testing
- Monthly monitoring (e.g., SIR, secondary containment with interstitial monitoring, groundwater monitoring or vapor monitoring)

-OR-

• Electronic Line Leak Detector capable of detecting a 0.2 gallon per hour leak on

a monthly basis and a 3.0 gallon per hour catastrophic leak continuously

#### Suction Piping -

- For suction piping that does not meet the definition of "Safe" or "European" suction (see definition at bottom of page 4), the two forms of release detection are:
- Line Tightness Testing every three years
- Monthly monitoring (e.g., SIR, secondary containment with interstitial monitoring, groundwater monitoring or vapor monitoring)

## C. Do You Know if Your Release Detection is "Certified" to Work at Your UST Site?

Release detection must meet specific performance requirements. You should have documentation (a third party evaluation) from the manufacturer, vendor, or installer of your release detection equipment showing certification that it can meet performance requirements. An impartial "third party" is paid to test the release detection equipment and certify that performance requirements are met.

An independent workgroup of release detection experts periodically evaluates all third-party certifications, thus providing a free and reliable list of evaluations of third-party certifications for various release detection equipment. Frequently updated, this list is available on the Internet at the National Work Group on Leak Detection Evaluations' web site (http://www.nwglde.org).

All approved leak detection methods must be able to detect a leak above the allowable regulatory limit at least 95% of the time. To ensure that your leak rate tests are performed properly and can reliably detect leaks, you should pay special attention to the "limitations" that are listed in the third party certification. This section specifies the conditions under which the leak detection method was tested. If your leak rate tests are performed under conditions that are different from those used for the third party certification, then your leak rate tests have not been performed properly and you may be obtaining erroneous results. In other words, your UST system could be leaking and you wouldn't even know it.

For example, some third party certifications for Automatic Tank Gauges (ATGs) require that a UST be more than 50% full at the time of the test. If the tank was less than half full when the leak rate test was run, then the test was performed improperly, the results (even passing results) are not valid.

Check the third party certification to ensure that the method you use has been approved for use with the type of tank or piping you have or the type of product being stored. Pay special attention to the tank size, product and throughput limitations your method might have. Also, if you have manifolded tanks make sure your method specifically mentions that it works for manifolded tanks.

That's why you need to make sure your release detection method has clear certification that it will work effectively at your site with its specific characteristics.

## D. How Can You Make Sure Your Release Detection Method is Working at Your UST Site?

If you don't understand your operation and maintenance responsibilities and don't know what operation and maintenance tasks you must routinely perform, you may allow your UST site to

become contaminated. Then, you might face high cleanup costs, run the risk of lowering the value of your property and potentially open yourself up to lawsuits.

To avoid these problems, use the checklists on the following pages that describe each type of leak detection method, discuss actions necessary for proper operation and maintenance, and note the records you should keep.

Locate the methods of release detection you are using at your facility, review these pages, and periodically complete the checklist. You might want to copy a page first and periodically fill out copies later.

If you have questions about your release detection system, review your owner's manual or call the vendor or manufacturer of your system. A NCDEQ UST inspector may also be able to provide assistance.

You will find leak detection record keeping forms in the following pages of this section. Keeping these records increases the likelihood that you are conducting good operation and maintenance and providing effective release detection at your UST site. For example, see page 22 for a "30-Day Release Detection Monitoring Record" form.

If you ever suspect or confirm a leak, refer to Chapter 4. **Never ignore leak detection alarms or** failed leak detection tests. Treat them as potential leaks!

# E. Am I Required to Have Secondary Containment and Perform Interstitial Monitoring on my UST Systems?

Currently, only UST systems located between 100 and 500 feet of wells serving public water supplies, between 50 and 100 feet of any other well used for human consumption and within 500 feet of protected surface waters are required to have secondary containment and interstitial monitoring. Protected surface waters include any that the State has designated as High Quality Water (HQW), Outstanding Resource Water (ORW), Water Supply I, Water Supply II and Shellfishing. Please contact the Division of Water Resources at 919-807-6300 or visit their web page at <a href="http://portal.ncdenr.org/web/wq/ps/csu/classifications">http://portal.ncdenr.org/web/wq/ps/csu/classifications</a> to determine if surface waters near you meet the above classifications.

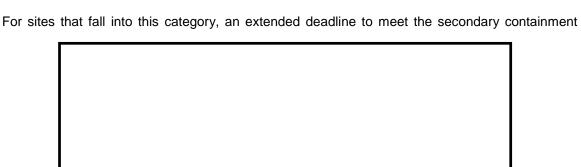


Figure 1 - Secondary Containment Upgrade Deadlines

requirements has been established. During this extension these sites must conduct enhanced leak detection, which is a combination of more stringent release detection monitoring and well sampling. The box below details the secondary containment upgrade schedule.

The basic requirements of enhanced leak detection are:

 Install a standard or continuous automatic tank gauge (ATG) for each UST. For a standard ATG, conduct at least one valid 0.1 gallon per hour (gph) leak test per month or one valid 0.2 gph leak test per week. For a continuous ATG, conduct at least one valid 0.2 gph leak test per week.

Note: A standard ATG collects product levels and temperature from a UST for a period of time and then performs a leak test. A UST system must be shut down while a leak test is in progress. A continuous ATG continuously collects data and performs a leak test whenever enough acceptable data has been collected. With a continuous ATG, a UST system does not need to be taken out of service while a leak test is in progress.

- Install an electronic line leak detector (ELLD) for each pressurized piping system. The ELLD
  must be capable of detecting a 3.0 gph leak. In addition, use the ELLD to perform at least one
  valid 0.1 gph leak test per month or one 0.2 gph test per week on the lines.
- Conduct a line tightness test once per year for each suction piping system. The line tightness
  test must be capable of detecting a leak rate of 0.1 gph. "European" or "safe" suction systems
  are excluded from this requirement.
- Public Water Supply wells located between 100 and 500 feet from the UST system and any
  other well used for human consumption located between 50 and 100 feet from the UST system
  must be sampled once per year for volatile organic compounds (VOCs) and semi-volatile
  organic compounds (SVOCs). If the UST system contains waste oil, the wells must also be
  sampled for lead and chromium. Samples must be collected and laboratory results received
  by your UST Regional office by October 1st of each year.

For detailed information on this topic please consult the NCDEQ-UST brochure "Siting and Secondary Containment Requirements for Underground Storage Tank Systems near Wells and Surface Waters" available at <a href="http://www.wastenotnc.org">http://www.wastenotnc.org</a> or by calling the UST Central Office at 919-707-8171.

## F. Leak Detection Methods Description and Requirements

Automatic Tank Gauging (ATG) Systems  (for tanks only)					
Description Of Release Detection  Have Certification For Your Release	An automatic tank gauging (ATG) system consists of a probe permanently installed in a tank and wired to a monitor to provide information on product level and temperature. ATG systems automatically calculate the changes in product volume that can indicate a leaking tank.  Make sure your ATG system is certified for the types of tanks and stored contents on which the ATG system is used.  Manufacturers are required to have their leak detection devices tested and certified by a third party to verify that their equipment meets specific performance requirements set by				
Detection Method	regulatory agencies. If you don't have a third-party certification (sometimes called a certified performance claim), have the manufacturer provide it to you.  Use your ATG system to test for leaks at least every 30 days.				
	Most systems are already programmed by the installer to run a leak test periodically. If your system is not programmed to automatically conduct the leak test, refer to your ATG system manual to identify which buttons to push to conduct the leak test. Testing more often than monthly can catch leaks sooner and reduce cleanup costs and problems.				
	Make sure that the amount of product in your tank is sufficient to run the ATG leak test. The tank must contain a minimum amount of product to perform a valid leak detection test. For example, some ATG systems need 50% or more volume for a leak detection test to be valid. One source for determining that minimum amount is the certification for your leak detection equipment (as discussed above).				
Perform These Operation and Maintenance Actions	Frequently test your ATG system according to the manufacturer's instructions to make sure it is working properly.  Don't assume that your release detection system is working and never needs checking. Read your owner's manual, run the appropriate tests, and see if your ATG system is set up and working properly. Most ATG systems have a "test" or "self-diagnosis" mode that can easily and routinely run these checks. If the documentation from your ATG manufacturer does not state your ATG model is self-testing, then an annual check should be performed and documented.				
	☐ If your ATG ever fails a test or indicates a release, see Chapter 4 of this booklet for information on what to do next.				
	Periodically have a qualified UST contractor, such as the vendor who installed your ATG, service all the ATG system components according to the manufacturer's service instructions.  Tank probes and other components can corrode and/or malfunction and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. If your ATG manufacturer requires this maintenance, you will need to keep documentation to show that it has been completed. If the manufacturer does not provide a frequency for the checks, then they should be done annually.				
	Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom they need to report problems. Develop and maintain regular training programs for all employees.				
Keep These Operation and Maintenance Records	□ Keep results of your ATG system tests for at least one year.  Your monitoring equipment may provide printouts that can be used as records. In addition to the ATG leak test printouts you will need to have printouts of the alarm history for the past year. If your equipment does not provide printouts, you may use the Release Detection Monitoring Record form on page 22 to document your results. Unless you are recording actual release detection results at least every 30 days and maintaining records for at least one year, you are not doing leak detection right.				
	<ul> <li>Keep all records of calibration, maintenance, and repair of your release detection equipment for at least one year.</li> </ul>				
	☐ Keep all performance claims supplied by the installer, vendor, or manufacturer.  These records include the certification of your leak detection equipment described above.				

Sec	ondary Containment with Interstitial Monitoring
Description Of Release Detection	Secondary containment with interstitial monitoring is a method of leak detection where tanks and/or piping of double-wall construction have the space between the inner and outer wall – called the interstitial space – monitored manually or automatically for evidence of a leak. For tanks, the interstitial space is typically monitored directly. For piping, typically double-walled piping will slope back to a sump such that any product leaking from the inner wall will drain back to the sump and a sump sensor can detect it.
Have Certification For Your Release Detection Method	Make sure your interstitial monitoring equipment and any sensors are certified for the types of tanks, piping, and stored contents on which the release detection system is used. Manufacturers are required to have their leak detection devices tested and certified by a third party to verify that their equipment meets specific performance requirements set by regulatory agencies. If you don't have a third-party certification (sometimes called a certified performance claim), have the manufacturer provide it to you.
	☐ Use your release detection system to test for leaks at least every 30 days. Testing more often than monthly can catch leaks sooner and reduce cleanup costs and problems.
	Frequently test your release detection system according to the manufacturer's instructions to make sure it is working properly. Don't assume that your release detection system is working and never needs checking. Read your owner's manual, run the appropriate tests, and see if your system is set up and working properly. Some interstitial monitoring systems have a "test" or "self-diagnosis" mode that can easily and routinely run these checks. If the documentation from your interstitial monitoring system manufacturer does not state your model is self-testing, then an annual check should be performed and documented.
	If your interstitial monitoring ever fails a test or indicates a release, see Chapter 4 of this booklet for information on what to do next.
Perform These Operation and Maintenance Actions	Periodically have a qualified UST contractor, such as the vendor who installed your release detection system, service all the system components according to the manufacturer's service instructions. Tank probes and other components can corrode and/or malfunction and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. For example, you should check float-type sump sensors at least annually by turning them over to see if the float moves and causes the system to alarm. In addition, you should be checking the sensors for the proper installation height to detect a release. If your interstitial monitoring system manufacturer does not provide a frequency for the checks then they should be done annually.
	□ Keep interstitial monitoring access ports clearly marked and secured.
	□ Check your interstitial monitoring system owner's manual often to answer questions and to make sure you know the system's operation and maintenance procedures.  Call the system's vendor or manufacturer for a copy of the owner's manual if you don't have one.
	Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems. Develop and maintain regular training programs for all employees.
Keep These Operation and Maintenance Records	□ Keep results of your release detection system tests for at least one year. Your monitoring equipment may provide printouts that can be used as records. The types of reports that you need to printout are interstitial sensor alarm history and status reports. If your equipment does not provide printouts, you may use the Release Detection Monitoring Record form on page 22 to document your results. Unless you are recording actual release detection results at least every 30 days and maintaining records for at least one year, you are not doing leak detection right.
	☐ Keep all records of calibration, maintenance, and repair of your release detection equipment for at least one year.
	□ Keep all performance claims supplied by the installer, vendor, or manufacturer.  These records include the certification of your leak detection equipment described above.

	S	tatistical Inventory Reconciliation (SIR)  (for tanks & piping)					
Description Of Release Detection	SIR is a method in which a trained professional uses sophisticated computer software to conduct a statistical analysis of inventory, delivery, and dispensing data. You must supply the						
Have Certification For Your Release Detection Method		Make sure your SIR vendor's methodology is certified for the types of tanks, piping, and product on which you use SIR. Vendors are required to have their leak detection methodology tested and certified by a third party to verify that their SIR method meets specific performance requirements set by regulatory agencies. If you don't have a third-party certification (sometimes called a certified performance claim), have the vendor provide it to you.					
		Supply daily inventory data to your SIR vendor at least every 30 days. The vendor will provide you with your release detection results after the statistical analysis is completed.					
	۵	If your statistical inventory reconciliation ever fails a test or indicates a release, see Chapter 4 of this booklet for information on what to do next.					
		If you receive an "inconclusive" result, you must treat the result the same as you would for a failed leak test. See Chapter 4 for more information on reporting suspected releases.					
Perform These		Measure the water in your tank to the nearest one-eighth inch at least once a month and record the results on the SIR data sheet. You can use a paste that changes color when it comes into contact with water. An increase in water in a tank can indicate a failure of the tank and should be investigated as a suspected release. See Chapter 4 for more information on reporting suspected releases.					
Operation and Maintenance Actions		If you use an ATG system to gather data for the SIR vendor, periodically have a qualified UST contractor, such as the vendor who installed your ATG, service all the ATG system components according to the manufacturer's service instructions. Tank probes and other components can corrode and/or malfunction and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. Do this according to manufacturer's instructions. See the checklist for ATG systems on page 10.					
		If you stick your tank to gather data for the SIR vendor, make sure your stick can measure to one-eighth of an inch and can measure the level of product over the full range of the tank's height. You should check your measuring stick periodically to make sure that you can read the markings and numbers and that the bottom of the stick is not worn.					
	٥	Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems. Develop and maintain regular training programs for all employees.					
		Keep results of your SIR tests for at least one year. Unless you are keeping records of the 30-day release detection results and maintaining those records for at least one year, you are not doing leak detection right.					
	٥	<b>Keep all vendor performance claims.</b> This includes the third-party certification of the SIR method discussed above.					
Keep These Operation and Maintenance Records	٥	If you manually stick your USTs then you need to keep the daily stick readings, which show the product height in inches, for at least one year.					
		If you use an ATG system, keep all records of calibration, maintenance, and repair of your release detection equipment for at least one year.					
		Keep the records of investigations conducted as a result of any monthly monitoring conclusion of "Inconclusive" or "Fail" for at least one year. This may include the results of a tightness test performed during the investigation or a re-evaluation based on corrected delivery or dispenser data.					

	Vapor Monitoring (for tanks & piping)						
Description Of Release Detection	Vapor monitoring measures product vapors in the soil at the UST site to check for a leak. A site assessment performed by a North Carolina Licensed Geologist must determine the number and placement of monitoring wells that make sure a release is detected. NOTE: vapor monitors will not work well with substances that do not easily vaporize (such as diesel fuel).						
Have Certification For Your Release Detection Method	Make sure your vapor monitoring equipment is certified for the types of contents stored on which the release detection system is used. Manufacturers are required to have their leak detection devices tested and certified by a third party to verify that their equipment meets specific performance requirements set by regulatory agencies. If you don't have a third-party certification (sometimes called a certified performance claim), have the manufacturer provide it to you.						
	☐ Use your release detection system to test for leaks at least every 14 days. Testing more often than required can catch leaks sooner and reduce cleanup costs and problems.  Be sure you check all of your vapor monitoring wells.						
	If your vapor monitoring ever fails a test or indicates a release, see Chapter 4 of this booklet for information on what to do next.						
Perform These	☐ Frequently test your release detection system according to the manufacturer's instructions to make sure it is working properly. Don't assume that your release detection system is working and never needs checking. Some electronic vapor monitoring systems have a "test" or "self-diagnosis" mode. If you have components (such as monitoring equipment, probes or sensors) for your vapor monitoring system, read your manual and test your equipment to see if it is working properly.						
Operation and Maintenance Actions	Periodically have a qualified UST contractor, such as the vendor who installed your release detection system, service all the system components according to the manufacturer's service instructions. Probes and other components can corrode and/or malfunction and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually.						
	□ Keep your vapor monitoring wells clearly marked and secured.						
	□ Check your vapor monitoring system owner's manual often to answer questions and to make sure you know the system's operation and maintenance procedures. Call the system's vendor or manufacturer for a copy of the owner's manual if you don't have one.						
	Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems. Develop and maintain regular training programs for all employees.						
Keep These Operation and Maintenance	□ Keep results of your release detection system tests for at least one year. Your monitoring equipment may provide printouts that can be used as records. If your equipment does not provide printouts, you may use the Release Detection Monitoring Record form on page 22 to document your results. Unless you are recording actual release detection results at least every 14 days and maintaining records for at least one year, you are not doing leak detection right.						
Records	<ul> <li>Keep all records of calibration, maintenance, and repair of your release detection equipment for at least one year.</li> </ul>						
	□ Keep all performance claims supplied by the installer, vendor, or manufacturer.  These records include the certification of your leak detection equipment described above.						

	Groundwater Monitoring (for tanks & piping)						
Description Of Release Detection	Groundwater monitoring looks for the presence of liquid product floating on the groundwater at the UST site. A site assessment performed by a North Carolina Licensed Geologist must determine the number and placement of monitoring wells that make sure a release is detected. NOTE: this method cannot be used at sites where groundwater is more than 20 feet below the ground surface.						
Have Certification For Your Release Detection Method  Make sure your groundwater monitoring equipment is certified for the types of contents stored on which the release detection system is used. Manufacturers are required to have their leak detection devices tested and certified by a third party to verify that their equipment meets specific performance requirements set by regulatory agencie you don't have a third-party certification (sometimes called a certified performance claim have the manufacturer provide it to you.							
	☐ Use your release detection system to test for leaks at least every 14 days. Testing more often than required can catch leaks sooner and reduce cleanup costs and problems.  Be sure you check all of your groundwater monitoring wells.						
	If your groundwater monitoring indicates a release, see Chapter 4 of this booklet for information on what to do next.						
Perform These	Frequently test your release detection system according to the manufacturer's instructions to make sure it is working properly. Don't assume that your release detection system is working and never needs checking. Some electronic groundwater monitoring systems have a "test" or "self-diagnosis" mode. If you have components (such as monitoring equipment, probes or sensors) for your groundwater monitoring system, read your manual and test your equipment to see if it is working properly. Manual devices should be periodically checked to make sure they are working properly.						
Operation and Maintenance Actions	Periodically have a qualified UST contractor, such as the vendor who installed your release detection system, service all the system components according to the manufacturer's service instructions. Probes and other components can corrode and/or malfunction and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually.						
	□ Keep your groundwater monitoring wells clearly marked and secured.						
	□ Check your groundwater monitoring system owner's manual often to answer questions and to make sure you know the system's operation and maintenance procedures. Call the system's vendor or manufacturer for a copy of the owner's manual if you don't have one.						
	Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems. Develop and maintain regular training programs for all employees.						
Keep These Operation and Maintenance	□ Keep results of your release detection system tests for at least one year. Your monitoring equipment may provide printouts that can be used as records. If your equipment does not provide printouts, you may use the Release Detection Monitoring Record form on page 22 to document your results. Unless you are recording actual release detection results at least every 14 days and maintaining records for at least one year, you are not doing leak detection right.						
Records	<ul> <li>Keep all records of calibration, maintenance, and repair of your release detection equipment for at least one year.</li> </ul>						
	□ Keep all performance claims supplied by the installer, vendor, or manufacturer.  These records include the certification of your leak detection equipment described above.						

Inventory Control and Tank Tightness Testing  (for tanks only)						
This temporary method combines monthly inventory control with periodic tank tightness testing Inventory control involves taking measurements of tank contents and recording the amount of product pumped each operating day, measuring and recording tank deliveries, and reconciling all this data at least once a month. This combined method also includes tightness testing, a sophisticated test performed by trained professionals.  NOTE: This combination method can only be used temporarily for up to 10 years after installing a new UST or for up to 10 years after your tank meets the corrosion protection requirements.						
Have Certification For Your Release Detection Method  Make sure your tank tightness test method is certified for the types of tanks at contents stored on which the tightness test is used. Tightness tests are required to certified by a third party to verify that they meet specific performance requirements or regulatory agencies. If you don't have a third-party certification (sometimes called a performance claim), have the tightness tester provide it to you.						
	☐ Take inventory readings and record the numbers at least each day that product is added to or taken out of the tank. Record these readings on the "Daily Inventory Worksheet" provided for you on page 16.					
	Reconcile the fuel deliveries with delivery receipts by taking inventory readings before and after each delivery. Record these readings on the "Daily Inventory Worksheet" (see page 16).					
	Reconcile all your data at least every 30 days. Use a "Monthly Inventory Record" form (see page 17).					
	<ul> <li>Have a precision 0.1 gallon per hour tank tightness test conducted at least every five years. This testing needs to be conducted by a professional trained in performing tank tightness tests.</li> </ul>					
Perform These Operation and Maintenance	☐ If your tank ever fails a tank tightness test or if it fails two consecutive months of inventory control, see Chapter 4 of this booklet for information on what to do next.					
Actions	☐ Ensure that your measuring stick can measure to the nearest one-eighth inch and can measure the level of product over the full range of the tank's height. You should check your measuring stick periodically to make sure that you can read the markings and numbers and that the bottom of the stick is not worn.					
	☐ Ensure that your product dispenser is calibrated according to local standards or to an accuracy of 6 cubic inches for every five gallons of product withdrawn.					
	Measure the water in your tank to the nearest one-eighth inch at least once a month and record the results on the reconciliation sheet. You can use a paste that changes color when it comes into contact with water.					
	☐ Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems. Develop and maintain regular training programs for all employees.					
Keep These Operation and Maintenance	□ Keep your daily inventory worksheets and monthly inventory records for at least one year. The "Daily Inventory Worksheet" and "Monthly Inventory Record" provided on pages 16 and 17, respectively, may be used to satisfy this requirement. Unless you are reconciling your data every 30 days and maintaining records for at least one year, you are not doing leak detection right.					
Records	☐ Keep the results and supporting data sheets of your most recent tightness test.					
	<ul> <li>Keep all certification and performance claims for the most recent tank tightness test performed at your UST site.</li> </ul>					

Inventory Control and Tank Tightness Testing  Daily Inventory Worksheet								
FACILITY NAME:		•						
YOUR NAME:		DATE:	DATE:					
TANK IDENTIFICATION								
Type of Fuel								
Tank Size in Gallons								
STICK READING OF FUEL (in inches)								
Stick Reading of Water (required once per month)								
AMOUNT PUMPED	$\downarrow$	<b>\</b>	<b>\</b>	<b>\</b>	<b>\</b>			
Totalizer Reading								
Totalizer Reading								
Totalizer Reading								
Totalizer Reading								
Totalizer Reading								
Totalizer Reading								
Totalizer Reading								
Totalizer Reading								
TODAY'S SUM OF TOTALIZERS								
Previous Day's Sum of Totalizers								
AMOUNT PUMPED TODAY								
DELIVERY RECORD	$\downarrow$	<b>\</b>	<b>\</b>	<b>\</b>	<b>\</b>			
Inches of Fuel Before Delivery								
Gallons of Fuel Before Delivery (from tank chart)								
Inches of Fuel After Delivery								
Gallons of Fuel After Delivery (from tank chart)								
GALLONS DELIVERED (STICK) [Gallons "After" - Gallons "Before"]								
GROSS GALLONS DELIVERED (RECEIPT)								

KEEP THIS RECORD ON FILE FOR AT LEAST ONE YEAR

	Inve	entory C		nd Ta			ness	Test	ting	
MONTH	/ YEAR:				T۱	PE OF FUEL:				
	Y NAME:				D	TE OF WATE	R CHECK.			
TANK IDENTIFICATION NO.:				воок	LE	VEL OF WATE			DAILY OVER (+)	
DATE	INVENTORY (GALLONS)	GALLONS DELIVERED	GALLONS PUMPED	INVENTOR (GALLONS		(INCHES)	(GAL	LONS)	OR SHORT (-) ["End" - "Book"]	INITIALS
1	(+)	(-)	(=)							
2	(+)	(-)	(=)							
3	(+)	(-)	(=)							
5	(+)	(-)	(=)							
6	(+) (+)	(-)	(=) (=)							
7	(+)	(-)	(=)							
8	(+)	(-)	(=)							
9	(+)	(-)	(=)							
7	(+)	(-)	(=)							
8	(+)	(-)	(=)							
9	(+)	(-)	(=)							
10	(+)	(-)	(=)							
11	(+)	(-)	(=)							
12	(+)	(-)	(=)							
13	(+)	(-)	(=)							
14 15	(+) (+)	(-)	(=)							
16	(+)	(-)	(=)							
17	(+)	(-)	(=)							
18	(+)	(-)	(=)							
19	(+)	(-)	(=)							
20	(+)	(-)	(=)							
21	(+)	(-)	(=)							
22	(+)	(-)	(=)							
23	(+)	(-)	(=)							
24	(+)	(-)	(=)							
25	(+)	(-)	(=)							
26 27	(+)	(-)	(=)							
28	(+) (+)	(-)	(=) (=)							
29	(+)	(-)	(=)							
30	(+)	(-)	(=)							
31	(+)	(-)	(=)							
TOTAL	GALLONS PUMP	ED —		TOTAL G	ALL	ONS OVER OF	R SHORT	<b></b>		
•	HECK: last two digits TOTAL GALLONS							Compare t	these num	bers
	D number and enter		▼	+		130	=		<b>V</b>	gallons
	OTAL GALLONS Onswer is "YES" for 2						NO (circle	e one)		
your ai			T: THIS IS YOU				R ONE MO	ONTH		
			PIECE OF PAR							

	Manual Tank Gauging (for tanks 550 gallons or less only)					
Description Of Release Detection	This method may be used only for tanks of 550 gallons or less capacity meeting certain requirements. These requirements (tank size and test time) are found in the "Manual Tank Gauging for Small Underground Storage Tanks" publication and on the UST-16 "Manual Tank Gauging Record" form, both available via the internet at www.wastenotnc.org or by calling the UST Section Central Office at (919) 707-8171. Manual tank gauging involves taking your tank out of service for the testing period (at least 36 hours) each week, during which the contents of the tank are measured twice at the beginning and twice at the end of the test period. The measurements are then compared to weekly and monthly standards to determine if the tank is tight.					
Have Certification For Your Release Detection Method	□ None required.					
Perform These Operation and Maintenance Actions	<ul> <li>Once a week, record two inventory readings at the beginning of the test, allow the tank to sit undisturbed for the time specified on the UST-16 "Manual Tank Gauging Record" form, and record two inventory readings at the end of the test. (All UST forms may be obtained via the internet at www.wastenotnc.org or by calling 919-707-8171)</li> <li>Reconcile the numbers weekly and record them on a UST-16 "Manual Tank Gauging Record" form. (All UST forms may be obtained via the internet at www.wastenotnc.org or by calling 919-707-8171)</li> <li>If your tank ever fails the weekly standard or otherwise indicates a release, see Chapter 4 of this booklet for information on what to do next.</li> <li>At the end of 4 weeks, reconcile your records for the monthly standard and record the result on a UST-16 "Manual Tank Gauging Record" form. (All UST forms may be obtained via the internet at www.wastenotnc.org or by calling 919-707-8171)</li> <li>If your tank ever fails the monthly standard or otherwise indicates a release, see</li> </ul>					
	Chapter 4 of this booklet for information on what to do next.  Ensure that your measuring stick can measure to the nearest one-eighth inch and can measure the level of product over the full range of the tank's height. You should check your measuring stick periodically to make sure that you can read the markings and numbers and that the bottom of the stick is not worn.  Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems. Develop and maintain regular training programs for all employees.					
Keep These Operation and Maintenance Records	<ul> <li>Keep your manual tank gauging records for at least one year. Unless you are recording actual release detection results weekly and at least every 30 days and maintaining records for at least one year, you are not doing leak detection right.</li> </ul>					

Mai	nual Tank Gauging and Tank Tightness Testing (for tanks 551 to 2,000 gallons only)				
Description Of Release Detection	This temporary method combines manual tank gauging with periodic tank tightness testing. It may be used only for tanks 551 to 2,000 gallons in capacity. Manual tank gauging involves taking your tank out of service for the testing period (at least 36 hours) each week, during which the contents of the tank are measured twice at the beginning and twice at the end of the test period. The measurements are then compared to weekly and monthly standards to determine if the tank is tight. This combined method also includes tank tightness testing, a sophisticated test performed by trained professionals.				
Have Certification For Your Release Detection Method	NOTE: This combination method can only be used temporarily for up to ten years after installing a new UST or for up to 10 years after your tank meets the corrosion protection requirements.  Make sure your tank tightness test method is certified for the types of tanks and contents stored on which the tightness test is used. Tightness tests are required to be certified by a third party to verify that they meet specific performance requirements set by regulatory agencies. If you don't have a third-party certification (sometimes called a certified				
Perform These Operation and Maintenance Actions	<ul> <li>performance claim), have the tightness tester provide it to you.</li> <li>Once a week, record two inventory readings at the beginning of the test, allow the tank to sit undisturbed for the time specified in the UST-16 "Manual Tank Gauging Record" form, and record two inventory readings at the end of the test. (All UST forms may be obtained via the internet at www.wastenotnc.org or by calling 919-707-8171)</li> <li>Reconcile the numbers weekly and record them on a UST-16 "Manual Tank Gauging Record" form. (All UST forms may be obtained via the internet at www.wastenotnc.org or</li> </ul>				
	<ul> <li>by calling 919-707-8171)</li> <li>If your tank ever fails the weekly standard or otherwise indicates a release, see         Chapter 4 of this booklet for information on what to do next.</li> <li>At the end of 4 weeks, reconcile your records for the monthly standard and record</li> </ul>				
	the result on a UST-16 "Manual Tank Gauging Record" form. (All UST forms may be obtained via the internet at www.wastenotnc.org or by calling 919-707-8171)  If your tank ever fails the monthly standard or otherwise indicates a release, see Chapter 4 of this booklet for information on what to do next.				
	<ul> <li>Conduct a tank tightness test at least every five years. This testing needs to be conducted by a professional trained in performing tank tightness testing.</li> <li>If your tank ever fails a tank tightness test, see Chapter 4 of this booklet for information on what to do next.</li> </ul>				
	☐ Ensure that your measuring stick can measure to the nearest one-eighth inch and can measure the level of product over the full range of the tank's height. You should check your measuring stick periodically to make sure that you can read the markings and numbers and that the bottom of the stick is not worn.				
	Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom to report problems. Develop and maintain regular training programs for all employees.				
Keep These Operation	Keep your manual tank gauging records for at least one year. Unless you are recording actual release detection results weekly and at least every 30 days and maintaining records for at least one year, you are not doing leak detection right.				
and Maintenance Records	<ul> <li>□ Keep the results and the supporting data sheets of your most recent tightness test.</li> <li>□ Keep all certification and performance claims for tank tightness test performed at</li> </ul>				
	your UST site.				

UST-16			M	ANUAL T	ANK GAUGIN	NG REC	ORD				NC Interest
551 - 1,000 gal periodic tank	nk Size  550 gallons  lons (also r tightness to	equires esting) requires	Minimum Duration Of Test 36 hours 36 hours	Weekly Standard (1 test) 10 gallons 13 gallons 26 gallons	Monthly Standard (4-test average) 5 gallons 7 gallons 13 gallons	Person Facility Compare with the si If the calc Also, the r monthly s If either th leaking. A	your weekly retandards show ulated change monthly avera tandard in the e weekly or m as soon as pos	eadings and the vn in the table exceeds the very ge of the 4 were same way.	on the left. veekly standard ekly test results rds have been e	nge of the 4 wee , the UST may b must be compa xceeded, the US nal office UST se	e leaking. red to the ST may be
periodic tank	tightness to	esting)									
Start Test (month, day, and time)	First Initial Stick Reading	Second Initial Stick Reading	Average Initial Reading	Initial Gallons (convert inches to gallons) [a]	End Test (month, day, and time)	First End Stick Reading	Second End Stick Reading	Average End Reading	End Gallons (convert inches to gallons) [b]	Change In Tank Volume In Gallons + or (—) [b—a]	Tank Passes Test (circle YES or NO)
Date: Time: AM/PM					Date: Time: AM/PM						Y N
Date: Time: AM/PM					Date: Time: AM/PM						Y N
Date: Time: AM/PM					Date: Time: AM/PM						Y N
Date: Time: AM/PM					Date: Time: AM/PM						Y N
KEEP THIS PIE	CE OF PA	PER ON F	ILE FOR A	ΓLEAST 1 YI	EAR	•	standard, di	vide the sum o	to the monthly of the 4 weekly er result here >		Y N

UST-16 Revised 10/2015

Automatic Line Leak Detection  (for pressurized piping only)					
Description Of Release Detection	Automatic line leak detectors (LLDs) are designed to detect a catastrophic release from pressurized piping. Automatic LLDs must be designed to detect a leak at least as small as 3 gallons per hour at a line pressure of 10 psi within 1 hour. When a leak is detected, automatic LLDs must shut off the product flow, restrict the product flow, or trigger an audible or visual alarm. Typical automatic LLDs include both mechanical (MLLDs) and electronic line leak detectors (ELLDs). NOTE: Automatic LLDs that restrict flow need to be installed and operated as close as possible to the tank (LLDs are designed to detect a leak and restrict flow only between the detector and the dispenser).				
Have Certification For Your Release Detection Method	Make sure release detection equipment and any probes are certified for the types of piping, and contents stored on which the release detection system is used.  Manufacturers are required to have their leak detection devices tested and certified by a third party to verify that their equipment meets specific performance requirements set by regulatory agencies. If you don't have a third-party certification (sometimes called a certified performance claim), have the manufacturer provide it to you.				
Perform These Operation and Maintenance Actions	<ul> <li>Test your automatic LLDs annually according to the manufacturer's instructions to make sure they are working properly. Don't assume that your release detection system is working and never needs checking. LLDs are required by law to be tested annually. Some LLDs, typically ELLDs, have a "test" or "self-diagnosis" mode while others must be tested by a qualified UST contractor. If you do not have documentation that states your ELLD system is self-testing, then it must be tested annually.</li> <li>Periodically have a qualified UST contractor, such as the vendor who installed your release detection system, service all the system components according to the manufacturers' service instructions. Components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. If your ELLD system manufacturer requires this maintenance you will need to keep documentation to show it has been completed. If the manufacturer does not provide a frequency for the checks, then they should be done annually.</li> <li>If your LLD indicates a release (e.g., by restricting flow, shutting off flow or by sounding an alarm), see Chapter 4 of this booklet for information on what to do next.</li> <li>Make sure employees who run, monitor, or maintain the release detection system know exactly what they have to do and to whom they need to report problems. Develop and maintain regular training programs for all employees.</li> </ul>				
Keep These Operation and Maintenance Records	<ul> <li>Keep the annual test results that demonstrates that the LLD is functioning properly for at least one year.</li> <li>If used for monthly monitoring, keep results of your release detection system tests for at least one year. Your monitoring equipment system may provide printouts that can be used as records. In addition to the ELLD leak test printouts you will need the printouts of the ELLD alarm history for the past year. If you are using an ELLD that does not produce printouts to be used as records, you may use a log sheet such as the one on page 22 to record the status of your piping. Unless you are recording actual release detection results at least every 30 days and maintaining records for at least one year, you are not doing leak detection right.</li> <li>Keep all records of calibration, maintenance, and repair of your release detection equipment for at least one year.</li> <li>Keep all performance claims supplied by the installer, vendor, or manufacturer. These records include the certification of your leak detection equipment described above.</li> </ul>				

	Line Tightness Testing  (for piping only)
Description Of Release Detection	This method uses a periodic line tightness test to determine if your piping is leaking. Tightness testing can be performed by either a trained professional or by using a permanently installed electronic system. Often times, an electronic system will consist of an Electronic Line Leak Detector (ELLD) and be connected to Automatic Tank Gauge (ATG) console so that the results of the leak tests can be recorded.
Have Certification For Your Release Detection Method	<ul> <li>Make sure your line tightness testing or permanently installed electronic system is certified for the types of piping, and contents stored on which the release detection system is used. Manufacturers are required to have their line tightness test methods and release detection equipment tested and certified by a third party to verify that their services or equipment meet specific performance requirements set by regulatory agencies. If you don't have a third-party certification (sometimes called a certified performance claim), have the tightness tester or equipment manufacturer provide it to you.</li> <li>If line tightness testing is used for pressurized piping, the test must be conducted at least annually.</li> </ul>
	☐ If line tightness testing is used for suction piping, the test must be conducted at least every three years. "Safe suction" or "European" piping as described at the bottom of page 4 does not need release detection testing, unless the piping is located near a well used for human consumption or a protected surface water as described on page 8.
	□ All tightness testing must be conducted by a professional trained in performing line tightness testing or by using a permanently installed electronic system.
Perform These Operation and	☐ If your piping ever fails a line tightness test or if the electronic system indicates a release, see Chapter 4 of this booklet for information on what to do next.
Maintenance Actions	□ For electronic systems (such as an ELLD) have a qualified UST contractor, such as the vendor who installed your release detection system, periodically service all the system components according to the manufacturers' service instructions.  Components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. If your electronic system manufacturer requires this maintenance you will need to keep documentation to show it has been completed. If the manufacturer does not provide a frequency for the checks, then they should be done annually.
	Make sure employees who run, monitor, or maintain the electronic system know exactly what they have to do and to whom they need to report problems. Develop and maintain regular training programs for all employees.
Keep These Operation and Maintenance Records	□ Keep results of your line tightness tests for at least one year for pressurized piping or three years for suction piping. If you are using an electronic system, such as an ELLD, your monitoring equipment may provide printouts that can be used as records. For electronic systems, in addition to the annual leak test printout you will need to have printouts of the alarm history for the past year. If you are using an electronic system that does not produce printouts to be used as records, you may use a log sheet such as the one on page 22 to record the status of your piping. Unless you are recording and maintaining actual release detection results (annually for pressurized piping or every three years for suction piping) you are not doing leak detection right.
	☐ If you use a permanently installed electronic system, keep all records of calibration, maintenance, and repair of your equipment for at least one year.
	☐ Keep all performance claims supplied by the installer, vendor, or manufacturer. These records include the certification of the line tightness test used and/or your leak detection equipment described above.

	Release Detection Monitoring Record						
monitoring, monite absence of a leak		) that do not already <sub>l</sub>	provide hardcopy re	esults showing the p			
NOTE: Groundwa	ater and vapor monitori	ing wells must be che	ecked every 14 days	S.			
Facility Name:				Facility ID #:			
Street Address:							
County:		City (Nearest):		Zip Code:			
I. UST SYSTEI	M INFORMATION	UST System #1	UST System #2	UST System #3	UST System #4		
Tank/Piping ID (     differentiate bety	(if one is used to ween tanks, piping etc.)						
2. Tank Size (in ga	ıllons)	Ţ					
<ol><li>Product Type (e premium, diesel</li></ol>	.g., unleaded regular, , kerosene etc.)						
	ase Detection (e.g., gauging, interstitial D, monitoring wells etc.)						
	se detection is being ank and/or Piping	Tank / Piping	Tank / Piping	Tank / Piping	Tank / Piping		
II. UST SYSTE	M RELEASE N RESULTS	(Enter "N" for NO RELEASE DETECTED or "Y" for a SUSPECTED OR CONFIRMED RELEASE)					
Date Your Name		UST System #1	UST System #2	UST System #3	UST System #4		
		<u> </u>					
		<u> </u>					
		+					
		<del> </del>					
		+					
		+					
		1					
		†					

KEEP THIS FORM AND ALL ASSOCIATED PRINTOUTS / RECORDS ON FILE FOR AT LEAST ONE YEAR FROM THE DATE OF THE LAST ENTRY

Figure 3 - Release Detection Record

## **Chapter 4. Known or Suspected Releases**

You need to be fully prepared to respond to releases BEFORE they may occur. You need to know what to do when release detection methods indicate a suspected or confirmed release. Be ready to take the following steps, as appropriate.

## A. Stop the Release

- Take immediate action to prevent the release of more product.
- Turn off the power to the dispenser and "bag" the nozzle.
- Make sure you know where your emergency shutoff switch is located.
- Empty the tank, if necessary, to prevent further contamination of the site. You may need the assistance of your supplier or distributor.

## B. Contain the Spill or Overfill

Contain, absorb, and clean up any surface spills or overfills. You should keep enough absorbent material at your facility to contain a spill or overfill of petroleum products until emergency response personnel can respond to the incident. The suggested supplies include, but are not limited to, the following:

- Containment devices, such as containment booms, dikes, and pillows.
- Absorbent material, such as kitty litter, chopped corn cob, sand, and sawdust. (Be sure you
  properly dispose of used absorbent materials.)
- Mats or other material capable of keeping spills or overfills out of nearby storm drains.
- Spark-free flash light.
- Spark-free shovel.
- Buckets.
- Reels of "caution tape", traffic cones, and warning signs.
- Personal protective gear.

Also, identify any fire, explosion or vapor hazards and take action to neutralize these hazards.

## C. Call for Help

Contact your local fire or emergency response authority. Make sure you have these crucial telephone numbers prominently posted where you and your employees can easily see them. See page 26 for a form you can copy and post.

## D. Report to Authorities and Investigate

#### **Suspected Releases**

If you observe any of the following indications of a suspected release, submit a UST-17A "UST Suspected Release 24-Hour Notice" to the UST Section Central Office as soon as possible (within 24 hours):

- Any unusual operating conditions you observe such as erratic behavior of the dispenser, a sudden loss of product, or an unexplained presence of water in the tank. Note: you are not required to report if the system equipment is found to be defective, but not leaking, and is immediately repaired or replaced, or
- Results from your release detection system indicate a suspected release. Note: you are
  not required to report if the monitoring device is found to be defective and is immediately
  repaired, recalibrated, or replaced and further monitoring does not confirm the initial
  suspected release, or in the case of inventory control, a second month of data does not
  confirm the initial result.

Suspected releases must be investigated by performing a system check consisting of a tank tightness test and/or line tightness test to determine whether a leak exists in that portion of the tank that routinely contains product, or the attached delivery piping, or both.

- You must repair or replace the UST system, and begin corrective action if the tightness test results for the tank and/or piping indicate that a leak exists.
- Further investigation is not required if the test results for the tank and piping do not indicate that a leak exists and if environmental contamination is not the basis for suspecting the release.

Within seven days of observing indications of a suspected release, submit a UST-17B "UST Suspected Release 7-Day Notice" to the UST Section Central Office documenting the results of your investigation.

#### **Confirmed Releases**

If you observe any of the following indications of a confirmed release, contact your regional UST office and submit an UST-61 "24-Hour Release and UST Leak Reporting Form" as soon as possible (within 24 hours):

- Any spill or overfill of petroleum that exceeds 25 gallons or that causes a sheen on nearby surface water. Spills and overfills under 25 gallons that are contained and immediately cleaned up do not have to be reported. If they can't be cleaned up within 24 hours they must be reported to your regional UST office.
- Any released regulated substances at the UST site or in the surrounding area such as
  the presence of liquid petroleum; soil contamination; surface water or groundwater
  contamination; or petroleum vapors in sewer, basement, or utility lines.

Confirmed releases require a site check to be conducted. Site checks measure for the presence of a release where contamination is most likely to be present at the UST site. If the test results indicate that a release has occurred, you must begin corrective action. If the test results do not indicate that a release has occurred, further investigation is not required. Procedures for a site check are contained in the most recent version of the UST Section's "Guidelines for Site Checks, Tank Closure, and Initial Response and Abatement".

The next page contains a blank list for names and phone numbers of important contacts. Fill out this information for your facility so that you will know who to call in case of an emergency. Remove this page from the manual, copy it, fill it out, post it in a prominent place at your facility and make sure everyone at your UST facility is familiar with the list of contacts.

## **Release Response Important Contact Information** Phone # **Contact Name UST Regional Office: Fire Department: Ambulance: Police Department: County Fire Marshal: Repair Contractor: Other Contacts: NCDEQ UST Central Office** 1646 Mail Service Center, Raleigh, NC 27699-1646 Phone: (919) 707-8171 Fax: (919) 715-1117 Winston-Salem Regional Office Vinston-Salem Regional Of 450 W Hanes Mill Rd, Suite 300 Winston-Salem, NC 27105 Phone: (336) 776-9800 Fax: (336) 776-9797 Raleigh Regional Office Washington Regional Office 3800 Barrett Drive Raleigh, NC 27609 Phone: (919) 791-4200 Fax: (919) 571-4718 943 Washington Square Mall Washington, NC 27889 Phone: (252) 946-6481 Asheville Regional Office Guilford County Dept. of Public Health 1203 Maple Street Greensboro, NC 27405 2090 U.S. Highway 70 Swannanoa, NC 28778 Fax: (252) 975-3716 Phone: (828) 296-4500 Fax: (828) 299-7043 Phone: (336) 641-3771 Fax: (336) 641-4812 Chalan Mooresville Regional Office 610 East Center Avenue, Suite 301 Mooresville, NC 28115 Wilmington Regional Office 127 Cardinal Drive Extension Wilmington, NC 28405 Phone: (910) 796-7215 Fax: (910) 350-2004 Fayetteville Regional Office Phone: (704) 663-1699 Fax: (704) 663-6040 Systel Building, Suite 714 225 Green Street Fayetteville, NC 28301 Phone: (910) 433-3300 Fax: (910) 486-0707 Regional Office 2/15 **Release Response Checklist** Stop the release: Take immediate action to prevent the release of more product. Turn off the power to the dispenser and "baq" the nozzle. Make sure you know where your emergency shutoff switch is located. Empty the tank, if necessary, to prevent further contamination of the site

Figure 4 - Release Response Contact Form

Contain the spill or overfill: Contain, absorb, and clean up any surface releases. Identify

Call for help and to report suspected or confirmed releases: Contact your local fire or

any fire, explosion or vapor hazards and take action to neutralize these hazards.

emergency response authority. Contact your regional UST office within 24 hours.

## Chapter 5 — Spill and Overfill Prevention

## A. Introduction

The purpose of spill and overfill prevention equipment is to eliminate the potential for a release during fuel deliveries. The equipment must be in working order and used properly to provide adequate protection from spills and overfills.

Even the best spill and overfill prevention equipment can become faulty over time if not properly operated and maintained.

Only one gallon of fuel leaking each week from a poorly maintained spill bucket can result in up to 195 tons of contaminated soil in a year.

Improper maintenance of the spill bucket at the UST site pictured below contributed to significant contamination of soil and groundwater.

### What's The Difference?

#### **Spill Prevention:**

A spill bucket is installed at the fill pipe to contain the drips and spills of fuel that can occur when the delivery hose is uncoupled from the fill pipe after delivery.

#### **Overfill Prevention:**

Equipment is installed on the UST that is designed to stop product flow, reduce product flow, or alert the delivery person during delivery **before** the tank becomes full and begins releasing petroleum into the environment.

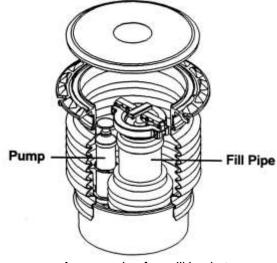
The following pages in this chapter focus on how you can routinely make sure your spill and overfill equipment is operating effectively.



## B. What Are The Basics Of Spill Prevention?

Your USTs must have spill buckets — also called spill catchment basins — installed at the fill pipe to contain spills that may occur as a result of fuel deliveries.

- The spill bucket is designed to temporarily contain product spills that might occur during fuel delivery. To contain a spill, the spill bucket must be liquid tight.
- The spill bucket is not designed to contain fuel for long periods of time and must be quickly emptied and the contents disposed of properly.
- Spill buckets need to be large enough to contain any fuel that may spill when the delivery hose is uncoupled from the fill pipe. Spill buckets typically range in size from 5 gallons to 25 gallons.



An example of a spill bucket

• If you use a checklist for correct filling practices (see page 33), spills should be eliminated or reduced to very small volumes that your spill bucket can easily handle.

## C. How do you maintain your spill bucket?

The checklist below provides information on properly maintaining your spill bucket.

## **Spill Bucket Operation and Maintenance Checklist**

Keep your spill bucket empty of liquids.

Some spill buckets are equipped with a valve that allows you to drain accumulated fuel into your UST. Others may be equipped with a manual pump so fuel can be put into your UST by pumping it through the fill pipe. However, keep in mind that when you pump out or drain your spill bucket into your UST, any water and debris may also enter the UST. If a basin is not equipped with a drain valve or pump, then any accumulated fuel or water must be removed manually and disposed of properly.

 Periodically check your spill bucket and remove any debris that may have accumulated.

Debris could include soil, stones, or trash.

Periodically check to see if your spill bucket is still liquid tight.
 Have a qualified UST contractor inspect your spill bucket for signs of wear, cracks, or holes.
 Based on this inspection, the contractor may suggest a test to determine if the spill bucket is tight or needs repair or replacement.

Table 2 - Spill Bucket O & M Checklist

## D. What are the Basics of Overfill Prevention?

Your USTs must have overfill prevention installed to help prevent the overfilling of tanks.

Three types of overfill prevention devices are commonly used:

- Automatic Shutoff Devices (e.g. Flapper Valves)
- Overfill Alarms (at the UST fill port)
- Ball Float Valves

If your UST *never* receives deliveries of more than 25 gallons at a time, the UST does not need to meet the spill and overfill prevention requirements. Many used oil tanks fall into this category. Even though these USTs are not required to have spill and overfill prevention, you should consider using them as part of good UST system management.

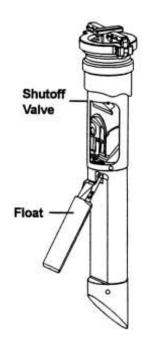
Each of these forms of overfill prevention is discussed in detail on the following pages.

## E. What Should You Do to Operate and Maintain Your Automatic Shutoff Device?

The automatic shutoff device is a mechanical device installed in line with the drop tube within the fill pipe riser. It slows down and then stops the delivery when the product has reached a certain level in the tank. It should be positioned so that the float arm is not obstructed and can move through its full range of motion.

When installed and maintained properly, the shutoff valve will shut off the flow of fuel to the UST at 95% of the tank's capacity or before the fittings at the top of the tank are exposed to fuel.

You should not use an automatic shutoff device for overfill prevention if your UST receives pressurized deliveries.



An example of a flapper valve style of automatic shutoff device

# **Basic Operation and Maintenance Checklist For Automatic Shutoff Devices**

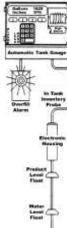
- □ A qualified UST contractor periodically checks to make sure that the automatic shutoff device is functioning properly and that the device will shut off fuel flowing into the tank at 95% of the tank capacity or before the fittings at the top of the tank are exposed to fuel:
  - Make sure the float operates properly.
  - Make sure that there are no obstructions in the fill pipe that would keep the floating mechanism from working.
- ☐ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.

## Table 3 - Auto shutoff Device O & M Checklist

F. What Should You Do To Operate and Maintain Your Electronic Overfill Alarm?

This type of overfill device activates an audible and/or visual warning to delivery personnel when the tank is either 90% full or is within one minute of being overfilled. The alarm <u>must</u> be located so that it can be seen and/or heard from the UST delivery location. Once the electronic overfill alarm sounds, the delivery person has approximately one minute to stop the flow of fuel to the tank.

Electronic overfill alarm devices have no mechanism to shut off or restrict flow. Therefore, the fuel remaining in the delivery hose after the delivery has been stopped will flow into the tank as long as the tank is not yet full.



An example of an automatic tank gauge being used as an electronic overfill alarm

# Basic Operation and Maintenance Checklist For Overfill Alarms

- □ A qualified UST contractor periodically checks your electronic overfill alarm to make sure that it is functioning properly and that the alarm activates when the fuel reaches 90% of the tank capacity or is within one minute of being overfilled:
  - Ensure that the alarm can be heard and/or seen from where the tank is fueled.
  - Make sure that the electronic device and probe are operating properly.
- ☐ You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and/or alarms in use at your facility.

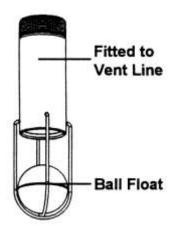
## Table 4 - O & M Checklist for Overfill Alarms

## G. What Should You Do To Operate and Maintain Your Ball Float Valve?

The ball float valve — also called a float vent valve — is installed at the vent pipe in the tank and restricts vapor flow out of an UST as the tank gets close to being full. The ball float valve should be set at a depth which will restrict vapor flow out of the vent line during delivery at 90% of the UST's capacity or 30 minutes prior to overfilling.

As the tank fills, the ball in the valve rises, restricting the flow of vapors out of the UST during delivery. The flow rate of the delivery will decrease noticeably and should alert the delivery person to stop the delivery.

For ball float valves to work properly, the top of the tank must be air tight so that vapors cannot escape from the tank. Everything from fittings to drain mechanisms on spill buckets must be tight and be able to hold the pressure created when the ball float valve engages.



An example of a ball float overfill alarm

You should not use a ball float valve for overfill prevention if any of the following apply:

- Your UST receives pressurized deliveries.
- Your UST system has suction piping.
- Your UST system has single point (coaxial) stage 1 vapor recovery.

# Basic Operation and Maintenance Checklist for Ball Float Valves

- A qualified UST contractor periodically checks to make sure that the ball float valve is functioning properly and that it will restrict fuel flowing into the tank at 90% of the tank capacity or 30 minutes prior to overfilling:
  - Ensure that the air hole is not plugged.
  - Make sure the ball cage is still intact.
  - Ensure the ball still moves freely in the cage.
  - Make sure the ball still seals tightly on the pipe.
- You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and/or alarms in use at your facility.

### Table 5 - O & M Checklist for Ball Float Valves

Spill ar	nd Overfill Operation and Maintenance Checklist
Spill Bucket	<ul> <li>Keep your spill bucket empty of liquids.         Some spill buckets are equipped with a drainage valve which allows you to drain accumulated fuel into your UST. Others can be equipped with a manual pump so fuel can be put into your UST by pumping it through the fill pipe.         However, keep in mind that when you pump out or drain your spill bucket into your UST, any water and debris may also enter the UST. If a spill bucket is not equipped with a drain valve or pump, then any accumulated fuel or water must be removed manually and disposed of properly.</li> <li>Periodically check your spill bucket to remove any debris.         Debris could include soil, stones, or trash.</li> <li>Periodically check to see if your spill bucket is still liquid tight.         Have a qualified UST contractor inspect your spill bucket for signs of wear, cracks, or holes. Based on this inspection, the contractor may suggest a test to determine if the spill bucket is tight or needs repair or replacement.</li> </ul>
Automatic Shutoff Devices	<ul> <li>A qualified UST contractor periodically checks to make sure that the automatic shutoff device is functioning properly and that the device will shut off fuel flowing into the tank at 95% of the tank capacity or before the fittings at the top of the tank are exposed to fuel:         <ul> <li>Make sure the float operates properly.</li> <li>Make sure that there are no obstructions in the fill pipe that would keep the floating mechanism from working.</li> </ul> </li> <li>You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and/or alarms in use at your facility.</li> </ul>
Overfill Alarms	<ul> <li>A qualified UST contractor periodically checks your electronic overfill alarm to make sure that it is functioning properly and that the alarm activates when the fuel reaches 90% of the tank capacity or is within one minute of being overfilled:         <ul> <li>Ensure that the alarm can be heard and/or seen from where the tank is fueled.</li> <li>Make sure that the electronic device and probe are operating properly.</li> </ul> </li> <li>You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and/or alarms in use at your facility.</li> </ul>
Ball Float Valves	<ul> <li>A qualified UST contractor periodically checks to make sure that the ball float valve is functioning properly and that it will restrict fuel flowing into the tank at 90% of the tank capacity or 30 minutes prior to overfilling:         <ul> <li>Ensure that the air hole is not plugged.</li> <li>Make sure the ball cage is still intact.</li> <li>Ensure the ball still moves freely in the cage.</li> <li>Make sure the ball still seals tightly on the pipe.</li> </ul> </li> <li>You have posted signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and/or alarms in use at your facility.</li> </ul>

Table 6 - Spill & Overfill O & M Checklist

## H. How Can You Help Avoid Overfills?

As an owner or operator you are responsible for ensuring that releases due to spilling or overfilling do not occur during fuel delivery.

As part of this responsibility, you must:

- Ensure that the amount of product to be delivered will fit into the available empty space in the tank; and
- Ensure that the transfer operation is monitored constantly to prevent overfilling and spilling.

### Use a Checklist On Correct Filling Practices

If correct filling practices are used, you will not exceed the UST's capacity — see the following page for a checklist on correct filling procedures.

## **Use Signs, Alert Your Delivery Person**

Overfills are caused when the delivery person makes a mistake, such as ignoring an overfill alarm. The delivery person should know what type of overfill device is present on each tank at your facility and what action will occur if the overfill device is triggered — such as a visual and/or audible alarm or that the product flow into the tank will stop or slow significantly.

Educate and alert your delivery person by placing a clear sign near your fill pipes, in plain view of the delivery person. An example of such a sign for an overfill alarm system is below.

## **DELIVERY PERSON AVOID OVERFILLS**

- An **overfill alarm** is used for overfill prevention at this facility.
- Do not tamper with this alarm in any attempt to defeat its purpose.
- When the tank is 90% full, the overfill alarm whistles and a red light flashes.
- If you hear the alarm whistle or see the red light flashing,

### STOP THE DELIVERY IMMEDIATELY!

## Figure 5 - Overfill Prevention Sign

## Make Sure You Order the Right Amount

Also, you need to **make sure you've ordered the right amount of product for delivery**. Order only the quantity of fuel that will fit into 90% of the tank. For example, if you have a 10,000 gallon tank with 2,000 gallons already in the tank, you would order at the most a 7,000 gallon delivery. Do your homework right and you reduce the chance of overfills.

Remember: Your tank should never be more than 90-95% full.

	or	rect UST Filling Checklist
		Make and record accurate readings for product and water in the tank before fuel delivery.
		Order only the quantity of fuel that will fit into 90% of the tank.
		REMEMBER, the formula for determining the maximum amount of gasoline to order is:
What To Do		(Tank capacity in gallons X 90%) - Product currently in tank = Maximum amount of fuel to order
Before Filling Your USTs		<b>Example:</b> $(10,000 \text{ gal } \times 0.9) - 2,000 \text{ gal} = 7,000 \text{ gal}$ maximum amount to order
		Ensure fuel delivery personnel know the type of overfill device present at the tank and what actions to perform if it activates. For example, you could use a sign, much like the one found on page 33, to let fuel delivery personnel know what you have. (Note: Since the wording of the sample sign on page 33 is for overfill alarms specifically, you may need alter the wording.)
		Review and understand the spill response procedures.
		Verify that your spill bucket is empty, clean, and will contain spills.
		Keep fill ports locked until the fuel delivery person requests access.
		Have an accurate tank capacity chart available for the fuel delivery person.
What To Do While Your USTs Are Being Filled		Have the fuel delivery person make all hook-ups. The person responsible for monitoring the delivery should remain attentive and observe the entire fuel delivery, be prepared to stop the flow of fuel from the truck to the UST at any time, and respond to any unusual condition, leak, or spill which may occur during delivery.
		Have response supplies readily available for use in case a spill or overfill occurs (see Chapter 4).
		Provide safety barriers around the fueling zone.
		Make sure there is adequate lighting around the fueling zone.
		Following delivery, the fuel delivery person is responsible for disconnecting all hook-ups.
What To Do After Filling Your USTs		Return spill response kit and safety barriers to proper storage locations.
		Make and record accurate readings for product and water in the tank after fuel delivery.
		Verify the amount of fuel received.
		Make sure fill ports are properly secured.
		Ensure the spill bucket is free of product and clean up any small spills.

**Table 7 - Correct UST Filling Checklist** 

## **Chapter 6. Corrosion Protection**

#### A. Overview

Corrosion protection for UST systems is important because unprotected steel USTs and piping can and do corrode. This may allow the release of product into the environment.

To prevent these leaks, all parts of your UST system that are underground and routinely contain product need to be protected from corrosion. The UST system includes the tank, piping, and ancillary equipment, such as flexible connectors, fittings, and pumps.

One way to protect UST components from corrosion is to make them with nonmetallic, noncorrodible materials, such as USTs made of (or clad or jacketed with) fiberglass reinforced plastic (FRP) or other noncorrodible materials — as illustrated by the FRP tank on the right. Noncorrodible USTs like these do not require operation and maintenance for corrosion protection.

UST components made from metal, however, that routinely contain product and are in direct contact with the ground need corrosion protection provided by cathodic protection or (in some cases) lining the interior of the tank, as described on the next page. These options require proper operation and maintenance.



Fiberglass reinforced plastic tanks being installed



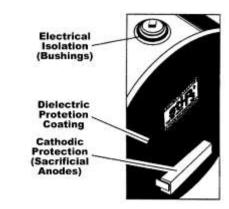
An example of a tank that has rusted to the point where it leaked

NOTE: Metal tanks or piping installed after December 22, 1988 must have a dielectric coating (a coating that does not conduct electricity) in addition to the cathodic protection described in this chapter.

#### **B. Corrosion Protection Methods**

## **Cathodic Protection Using Sacrificial Anode Systems**

Sacrificial anodes are buried and attached to UST components for corrosion protection — as illustrated on the right by an anode attached to a tank. Anodes are pieces of metal that are more electrically active than steel, and thus they suffer the destructive effects of corrosion rather than the steel they are attached to. Sacrificial anodes are typically made of zinc or magnesium. A common prefabricated UST with sacrificial anodes is the sti-P3 tank.



An example of a sti-P3 cathodically protected tank

#### Cathodic Protection Using Impressed Current Systems

An impressed current system — as shown on the right — uses a rectifier to provide direct current through anodes to the tank or piping to achieve corrosion protection. The steel is protected because the current going to the steel overcomes the corrosion-causing current flowing away from it. The cathodic protection rectifier must always be on and operating to protect your UST system from corrosion.

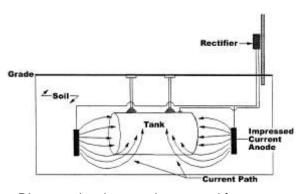
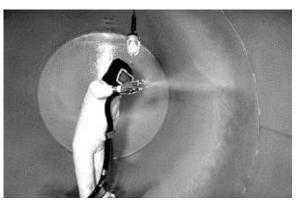


Diagram showing a tank protected from corrosion with impressed current

#### Corrosion Protection Using Internal Lining Of The Tank

This corrosion protection option applies only to tanks installed before December 22, 1988. These older tanks were able to be internally lined by trained professionals to meet the corrosion protection requirements — as shown on the right, in which a professional follows industry codes to safely and effectively line a tank's interior.



The interior of an UST being lined

It may help you to see your corrosion protection options displayed in the following table.

Corrosion Protection Choices				
Option	Description			
Noncorrodible Material	The tank or piping is constructed of noncorrodible material (e.g. fiberglass reinforced plastic).			
Steel Tank Clad or Jacketed with a Noncorrodible Material	Examples of cladding or jacket material include fiberglass and urethane. Does not apply to piping.			
Coated and Cathodically Protected Steel Tanks or Piping	Steel tank and piping is well-coated with a dielectric material and cathodically protected. Cathodic protection is usually provided by an impressed current system or by sacrificial anodes.			
Cathodically Protected Noncoated Steel Tanks or Piping	This option is only for steel tanks and piping installed before  December 22, 1988. Cathodic protection is usually provided by an impressed current system.			
Internal Lining of Tanks	This option is only for steel tanks installed before December 22, 1988. A lining is applied to the inside of the tank. Does not apply to piping.			
Combination of Cathodically Protected Steel and Internal Lining of Tanks	This option is only for steel tanks installed before December 22, 1988. Cathodic protection is usually provided by an impressed current system. Does not apply to piping.			
Other Methods Used to Achieve Corrosion Protection	If you have tanks or piping that do not meet any of the descriptions above, check with NCDEQ-UST Section to see if your UST system meets the requirements for corrosion protection. You will also need to ask about the operation, maintenance, and record keeping requirements applicable to this type of UST system.			

**Table 8 - Corrosion Protection Choices** 

NOTE: In addition to tanks and piping, all other metal components in direct contact with the ground that routinely hold product — such as flexible connectors, swing joints, fittings, siphon bars and pumps — must also be cathodically protected.

All USTs that were upgraded with corrosion protection after their installation were required to have an integrity assessment prior to the addition of corrosion protection. Only tanks found to be suitable for upgrading should have been upgraded with corrosion protection. Tanks that were determined unsuitable for upgrading should have been permanently closed. Furthermore, all field-installed corrosion protection systems were required to be designed by a corrosion expert.

## C. Operation and Maintenance Checklist and Record Keeping Forms

The operation and maintenance checklist on the following page can be used to help you determine whether you are operating and maintaining your corrosion protection correctly. Record keeping forms have also been provided for you to help with your documentation.

#### **Basic Operation and Maintenance Checklist for Corrosion Protection** You need to have periodic tests conducted by a qualified corrosion tester to make sure your corrosion protection system is adequately protecting your UST system. These tests need to be conducted: ■ Within 6 months of installation. ☐ At least every 3 years after the previous test. ☐ Within 6 months after any repairs to your UST system. Make sure that the professional tester is qualified to perform the test and follows a Sacrificial Anode **Cathodic Protection** standard code of practice to determine that test criteria are adequate. **Systems** If any test indicates that your tanks are not adequately protected, you need to have a corrosion expert examine and fix your system. Testing more frequently can catch problems before they become big problems. You need to keep the results of at least the last two three-year tests on file. The UST-7A form is used to record the results a corrosion tester observes when testing your sacrificial anode system.(All UST forms may be obtained via the internet at http://www.wastenotnc.org or by calling 919-707-8171) You need to have periodic tests conducted by a qualified corrosion tester to make sure your cathodic protection system is adequately protecting your UST system. These tests need to be conducted: ■ Within 6 months of installation. At least every 3 years after the previous test. ☐ Within 6 months after any repairs to your UST system. Make sure that the professional tester is qualified to perform the test and follows a standard code of practice to determine that test criteria are adequate. If any test indicates that your tanks are not adequately protected, you need to have a corrosion expert examine and fix your system. Testing more frequently can catch problems before they become big problems. ☐ You need to keep the results of at least the last two three-year tests on file. The UST-7B form is used to record the results a corrosion tester observes when **Impressed Current** testing your impressed current system. (All UST forms may be obtained via the **Cathodic Protection** internet at http://www.wastenotnc.org or by calling 919-707-8171) **Systems** You need to inspect your rectifier at least every 60 days to make sure that it is operating within normal limits. This inspection involves reading and recording the voltage and amperage readouts on the rectifier. You or your employees can perform this periodic inspection. Make sure that your cathodic protection professional provides you with the rectifier's acceptable operating levels so that you can compare the readings you take with an acceptable operating level. If your readings are not within acceptable levels, you must contact a cathodic protection professional to address the problem. ☐ You need to keep records of at least the last 3 rectifier readings. See page 38 for a "60-Day Inspection Results" record keeping form. ☐ You should have a trained professional periodically service your impressed current system. Never turn off your rectifier! Within 10 years after lining and at least every 5 years thereafter, a lined tank must be inspected by a trained professional and found to be structurally sound with the lining still performing according to original design specifications. Make sure the professional performing the inspection follows Internally a standard code of practice. Lined ☐ Lining inspection can only be eliminated if corrosion protection was added **Tanks** to a tank at the same time it was lined or an integrity assessment of the tank was performed just prior to adding corrosion protection. Keep records of the inspection including any specific forms stipulated in the industry standards used for the lining inspection.

Table 9 - Basic O & M Checklist for Corrosion Protection

## UST-21 IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM 60-DAY RECORD OF RECTIFER OPERATION



- > This form may be utilized to document that the cathodic protection system rectifier is checked for operation at least once every 60 days.
- Checked for operation is taken to mean that it was confirmed the rectifier was receiving power and is "turned-on".
- Any significant variance should be reported to your corrosion professional so that any repairs and/or adjustments necessary can be made.

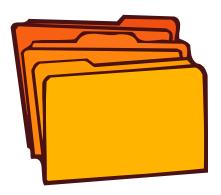
UST OWNER	₹			UST FACILITY					
Owner Name					Facility Name				Facility ID#:
Street Address				Street Address					
City State					City			Count	ty
IMPRESSED	CURRENT	RECTIFIER	DATA						
Rectifier Manu	ıfacturer:				Rated DC O	utput:		VC	OLTS
								AMPS	
Rectifier Mode	el:				Rectifier Seri	ial Number:			
What is the 'as	s designed' or I	astly recomn	nended red	ctifier output?	?		VOLTS		AMPS
			60-DA	Y LOG OF	RECTIFIER	OPERATIO	N		
DATE	RECTIFIER	TAP SET	TINGS	DC C	DUTPUT	HOUR METER	INSPECTOR INITIALS		COMMENTS
INSPECTED	TURNED ON?	COARSE	FINE	VOLTS	AMPS				
								<u> </u>	
							STE MANAGEMEN		SECTION tnc.org/web/wm 10/15

Figure 6 - UST-21 Impressed Current 60 Day Record

# Chapter 7. Record Keeping and Compliance Checklist

#### A. What Records Must You Keep?

It is important to be organized and stay organized. A great deal of future problems can be prevented if you practice good organizational skills. Keep all of your UST records in one area so you can find them when you need them. Table 7a lists the major record keeping requirements for UST systems and Table 7b lists all the current NCDEQ UST forms and what they are used for.



#### **B. UST Record Keeping: The Basics**

- □ Save all of your records. This includes receipts, invoices, warrantees, guarantees, pictures, videos, manuals or anything about your UST system.
- □ Keep all test results, performance claims, inspections, corrosion tests, repair records, closures and assessment reports and proof of financial responsibility.
- □ Keep your records on site or at a place easy to access in case you have to provide information to an inspector.
- ☐ In general, you should keep all of your records for as long as the tank system is in place.
- □ Attention new tank owners: If you purchase an existing system or become a new operator, make sure you get copies of all existing records.

### C. Where Should you Keep Your Records?

A UST owner or operator must keep all required records at the UST site itself or at a readily available alternative site and must provide records for inspection upon request.

Keep all of your records in one central location, preferably in one filing cabinet so you can find them easily. A notebook binder for each facility provides an excellent way of organizing your records.



#### TIP:

For ease of access and to help facilitate UST inspections, keep all your records for an UST facility in a single binder.

Table 10 - UST Compliance Records			
RECORD(S)	DESCRIPTION		
Copy of the Current UST Operating Permit	Permits are renewed and UST fees paid annually through the UST Central Office.		
Site Diagram	A site diagram must be maintained on site. The site diagram should include the following information:		
	□ Location of each UST, dispenser, and associated piping with respect to property boundaries, roads and other permanent structures		
	□ Year each UST was installed		
	□ Storage capacity of each UST		
	<ul><li>Exact type of product stored in each UST (regular, premium, kerosene, etc.)</li></ul>		
UST-6 "Notice of Intent to Install	A copy of the original UST-6 form should be retained for your records.		
Underground Storage Tanks"	□ All parts of the form must be completed		
	□ Form must be signed		
UST-8 "Notification for Activities Involving Underground Storage Tank Systems (USTs)"	Any time an activity (e.g., installing a new UST and/or piping, putting tanks into temporary closure, changing release detection methods etc.) occurs, an UST-8 form should be completed and sent in. Please retain a copy for your records.		
	□ Form must be signed		
	<ul> <li>Your current form of Financial Responsibility must be listed and kept up to date</li> </ul>		
UST-15 "Change of Ownership of UST System(s)"	If a change in ownership has occurred an UST-15 should be submitted and a copy retained for your records.		
	<ul> <li>Must be completed by both the previous owner (seller) and the new owner (buyer)</li> </ul>		
	□ Both parts must be signed and notarized		
	<ul> <li>Documentation showing proof of the transfer of ownership, including the date of transfer, should be attached</li> </ul>		
UST-15A "Ownership of UST System(s)"	If new USTs have been installed an UST-15A should be submitted and a copy retained for your records.		
	□ Form must be signed and notarized		
UST-3 "Notice of Intent: UST Permanent Closure or Change-in- Service"	If any USTs at the location have been closed or have had a change-in- service then these two forms must be submitted to the appropriate regional office, as well as the UST Central Office. A copy must be retained for your records.		

Table 10 - UST Compliance Records			
RECORD(S)	DESCRIPTION		
UST-2 "Site Investigation Report for Permanent Closure or Change-in-Service of UST"			
Upgrade, Maintenance and Repair Information	Any maintenance, upgrade and repair work must be documented. The documentation must answer the following questions:		
	□ Who did the work? When was the work done? What work was done (be specific as possible)? What industry standards were used in the work? (Copies of detailed invoices or work plans may help immensely in satisfying this requirement.)		
	If ANY of the work dealt with a corrosion protection system, what were the qualifications and/or certifications of the person doing the work?		
	□ For UST systems that were upgraded with corrosion protection, what integrity assessment method was used to determine that the system was capable of being upgraded? What were the results of the assessment? Who did the work? When was the work done?		
	□ For repaired UST systems (e.g., ones that leaked), documentation that repairs were done in accordance with the manufacturer's instructions and/or national standards, copies of tightness tests, integrity assessment reports, etc. must be maintained for the life of the system.		
UST-7A " North Carolina Cathodic Protection System	All UST systems that use corrosion protection systems, such as sacrificial anodes or impressed current, must:		
Evaluation for Galvanic (Sacrificial Anode) Systems" UST-7B " North Carolina Cathodic Protection System	□ Be tested within six months of installation		
	□ Be tested at least every three years thereafter		
	□ Be tested by a qualified cathodic protection tester		
Evaluation for Impressed Current Systems"	□ A completed and signed UST-7A form must be submitted to the UST Central Office within 30-days following any testing of a galvanic (sacrificial anode) system		
	□ A completed and signed UST-7B form must be submitted to the UST Central Office within 30-days following any testing of a impressed current system		
	□ Copies of the last two tests must be retained for your records		
UST-7A / UST-7B (cont.)	In addition, UST systems using impressed current cathodic protection systems require:		
	<ul> <li>Systems must be inspected every 60 days to ensure that the equipment is running properly</li> </ul>		
	<ul> <li>A log sheet showing the date, current operational status (i.e. readings for voltage and current) and the name of the person who</li> </ul>		

Table 10 - UST Compliance Records					
RECORD(S)	DESCRIPTION				
	checked the system for the last three inspections should be retained for your records (see page 38)				
Release Detection Records: Tanks	□ Last 12-months of release detection records. (e.g., ATG receipts, SIR results, Inventory Control worksheets and associated tank tightness tests, etc.). If your release detection method is electronic, you also need to keep its alarm history report.				
Release Detection Records:	Pressurized Piping Systems Require ALL of the following:				
Piping (Pressurized Systems)	<ul> <li>Performance claims (Third-Party Certifications) of the Automatic Line Leak Detectors (ALLD)</li> </ul>				
	<ul> <li>Results of the last annual test of the ALLD. (If an electronic line le detector is being used it must be tested annually unless it can be documented that it performs a self-check)</li> </ul>				
	□ Results of the last annual Line Tightness Test (LTT)				
	In lieu of an annual LTT, the last 12 months of release detection records of an approved method of monthly monitoring for piping (e.g. SIR, interstitial monitoring, electronic line leak detector, groundwater or vapor monitoring). If your release detection method is electronic you also need to keep its alarm history report.				
Release Detection Records:	Suction Piping Systems require only one of the following:				
Piping (Suction Systems)	<ul> <li>Results of the last Line Tightness Test (LTT) which are required once every three years</li> </ul>				
	□ Last 12 months of release detection records of an approved method of monthly monitoring for piping (e.g. SIR, Interstitial Monitoring, etc.). If your release detection method is electronic you also need to keep its alarm history report.				
	<ul> <li>Proof (e.g., UST-19 "Certification of Leak Detection Exemption for Suction Piping Associated with Underground Storage Tanks") that the suction piping system is exempt from the release detection requirements because:</li> </ul>				
Release Detection Records:	the piping system operates at less than atmospheric pressure				
Piping (Suction Systems) (cont.)	the piping slopes to allow product to drain back to the tank when suction is broken				

Table	e 10 - UST Compliance Records	
RECORD(S)	DESCRIPTION	
	there is one check valve, and only one check valve, which is located directly under the pump in the piping system	
UST-17A "UST Suspected Release 24-Hour Notice" UST-17B "UST Suspected	If the UST system has ever been suspected of having had a release or a release has been confirmed, it is important to have the following documentation:	
Release 7-Day Notice"	□ When did the suspected release occur	
UST-61 "24-Hour Release and UST Leak Reporting Form"	□ A copy of the UST-17A "UST Suspected Release 24-Hour Notice" and UST-17B "UST Suspected Release 7-Day Notice" that you submit to NCDEQ	
	☐ If the suspected release was confirmed, a copy of the UST-61 "24-Hour Release and UST Leak Reporting Form" that you submit to NCDEQ	
	If the suspected release was determined to be a false alarm (due to malfunctioning release detection equipment etc.), documentation of the repairs from the UST equipment contractor	
	<ul> <li>Any tank tightness tests or line tightness tests used to confirm or deny suspected releases</li> </ul>	
	☐ Any analytical results from soil or groundwater sampling	
UST-20 "Alternative Fuel/Hazardous Substance Compatibility Checklist"	If the UST system stores alternative fuels (ethanol blends containing greater than 10% ethanol or biodiesel blends containing greater than 20% biodiesel), it is important to have the following documentation:	
	□ A copy of the UST-20 "Alternative Fuel/Hazardous Substance Compatibility Checklist"	
Performance Claims (Third Party Certifications)	□ Third Party Certifications for all release detection equipment and programs (e.g., SIR programs, Tank Tightness Testing methods, Line Tightness Testing methods, Automatic Tank Gauges, probes, sensors, etc.)	
	<ul> <li>You are responsible for operating and maintaining your equipment and programs in accordance with the manufacturer's operating instructions and procedures</li> </ul>	
	□ Be sure that you have the exact "third party certification for each specific equipment, programs and methods	
	☐ If you do not have all the necessary third party certifications, contact the manufacturer or your supplier.	

	Table 11 - North Carolin	na UST Forms
ACTION TAKEN	NOTIFICATION REQUIRED	SUBMITTAL DEADLINE
Installation of a UST System	UST-6 "Notice of Intent to Install Underground Storage Tanks"	Required 30 days prior to installation
	UST-8 "Notification for Activities Involving Underground Storage Tank Systems (USTs)"	Required within 30 days after installation
	UST-15A "Ownership of UST System(s)"	Required within 30 days after installation
Installation of Vapor or Groundwater Monitoring System as a Method of Release Detection	UST-4 "Notice of Intent to Install Vapor or Groundwater Monitoring System"	Required 30 days prior to installation
Nelease Detection	UST-5 "Site Investigation Report for Installation of Vapor or Groundwater Monitoring System"	Required within 30 days after installation
Temporary Closure of USTs	UST-8 "Notification for Activities Involving Underground Storage Tank Systems (USTs)"	Required within 30 days of temporary closure
Permanent Closure or Change-in-Service of USTs	UST-3 "Notice of Intent: UST Permanent Closure or Change- in-Service"	Required 30 days prior to permanent closure or change-in-service if the work is NOT under the direct supervision of a Professional Engineer (P.E.) or a Licensed Geologist (L.G.). Required 5 days prior to permanent closure or change-in-service if the work is under the direct supervision of a Professional Engineer (P.E.) or a Licensed Geologist (L.G.)
	UST-2 "Site Investigation Report for Permanent Closure or Change-in-Service of UST"	Required within 30 days after permanent closure or change-in-service
When requesting Tax Certification	UST-18 "Application for Tax Certification"	Required when submitting Tax Certification requests
Change in Ownership	UST-15 "Change of Ownership of UST System(s)"	Required within 30 days of change in ownership
	UST-8 "Notification for Activities Involving Underground Storage Tank Systems (USTs)"	Required within 30 days of change in ownership

Table 11 - North Carolina UST Forms				
ACTION TAKEN	NOTIFICATION REQUIRED	SUBMITTAL DEADLINE		
Corrosion Protection System Testing	UST-7A "Cathodic Protection System Evaluation for Galvanic (Sacrificial Anode) Systems"	Required within 30 days of the completion of any corrosion protection system test		
	UST-7B "Cathodic Protection System Evaluation for Impressed Current Systems"			
Reporting of a Suspected Release	UST-17A "UST Suspected Release 24-Hour Notice"	Required within 24 hours of suspecting that a release has occurred based on release		
(based on release detection failure, unusual operating		detection failure, unusual operating condition or a failed internal inspection		
condition or a failed internal inspection)		Must be followed up with a UST-17B form		
Reporting Investigation Results of a Suspected Release	UST-17B "UST Suspected Release 7-Day Notice"	Required within 7 days of suspecting that a release has occurred based on release detection failure, unusual operating condition		
(based on release detection failure, unusual operating condition or a failed internal inspection)		or a failed internal inspection		
Reporting of a Known or Suspected Release	UST-61 "24-Hour Release and UST Leak Reporting Form"	Required within 24 hours of confirmation of a known or suspected release based on evidence (including odor, vapor, free product,		
(based on evidence, such as odor, free product, stained soil and analytical data)		stained soil and analytical data indicating contamination of soil or groundwater) that a release has occurred		
Documenting the results of the monthly release detection method: Manual Tank Gauging	UST-16 "Manual Tank Gauging Record"	If you are conducting Manual Tank Gauging as your method of tank release detection, the last 12 months of UST-16 records must be kept on site		
Documenting European Suction Piping Exemption	UST-19 "Certification of Leak Detection Exemption for Suction Piping Associated with Underground Storage Tanks"	Required for documenting any piping that meets the European suction qualifications.		
Documenting the Compatibility of an UST System with Alternative Fuels or Hazardous Substances	UST-20 "Alternative Fuel/Hazardous Substance Compatibility Checklist"	Required documentation must be submitted prior to placing alternative fuels (ethanol blends containing greater than 10% ethanol or biodiesel blends containing greater than 20% biodiesel) or Hazardous Substances into an UST system.		

All of these UST forms are available to you, free of charge, through the UST Central Office (919-707-8171) or via our web site: www.wastenotnc.org

# **Chapter 8. Additional Operation and Maintenance Suggestions**

### A. Not Necessarily the Law but a Good Idea

Do you and your staff have a maintenance program for the UST systems at your facility? If so, Table 8A (below) has some suggestions to improve it. If not, then the table has some pointers for starting a new maintenance program.

Use the checklist to see if you are doing routine maintenance on your UST systems. If you answer "yes" to the question, then proceed to the next. If you answer "no", then read the recommendation and think about how you could improve your own maintenance plan.

	Table 12 - Proper Maintenance Checklist
Answer Yes or No	to the following:
Training	Have all staff been trained to operate facility
	Y/N  If you answered No:  Make sure all of your staff have been adequately trained and that all equipment manuals are readily available. A bulletin board with checklists from this manual may assist in reminding staff of important things to do. Contact NCDEQ UST for other training ideas.
Manuals	Can you locate equipment manuals if you need
	Y/N  If you answered No:  Make a special space, file, or box which contains all of your manuals.  If you cannot find a manual, contact your equipment manufacturers or UST installers and request one.
Leaks	Do you and your staff know what to do if your overfill alarm goes off or if you have questionable  Y/N  If you answered No: See Chapters 3 through 5
Help	Do you know who to call for help or questions?  Y/N  If you answered No: See Chapter 9

## **B. Periodic Walkthrough Inspections**

Walkthrough inspections of all UST systems at your facility should be conducted periodically. The purpose of these inspections is to identify any visual signs of potential leaks, and to take corrective measures. See Table 8B and check the appropriate information for each item inspected. Make a note of any significant observations. Then contact a tank contractor and have them correct or repair any problems.

#### **Table 13 - Periodic Walkthrough Inspections** We suggest you do these inspections at least twice a year - In addition to other activities listed in the Operation Checklist: Check each item below and make repairs / changes as necessary: (make copies of this inspection checklist for each inspection you perform) ΑII Inspection What to look for OK? Equipment Date Dispenser Inspect all product dispenser hoses and nozzles for Y/Nloose fittings, deterioration, obvious signs of leakage Hoses/Nozzles and proper functioning If you answered No. then: Replace bad parts or call UST contractor for assistance. Report any suspected release (see Chapter 4) Dispenser Open each dispenser and inspect all visible Y/Ndispenser lines, fittings and couplings, and inspect Sumps the sump beneath the dispenser (if present) for any signs of leakage. If you answered No, then: Tighten loose parts or call UST contractor for help. Report any suspected release (see Chapter 4) **Sump Monitor** Inspect and test sump monitor to make sure it is Y/N(if present) working. If you answered No, then: Call manufacturer or read manual, or call UST contractor about repairs **Piping Sumps** Inspect the piping sumps located on the top of each Y/NUST for liquid. If you answered No, then: If liquid is present, determine if it is water only (i.e. rainwater) or if it contains product. If water is present and no product is present, pump the water out. If product or product and water is present in sumps, conduct the following activities: Notify the Facility Manager immediately. Pump out the product and place in a designated container for proper disposal. Evaluate source and take corrective action. Fill Pipes Inspect all tank fill pipes and other access points to Y/Nmake sure that the covers and caps are tightly sealed. Make sure that nothing has been inserted into the fill pipe or dual-point vapor recovery pipes that would interfere with the overfill prevention equipment. If you answered No, then: Secure caps and covers. Call UST contractor if problem persists. Spill Supplies Inventory and inspect the emergency spill response Y/Nsupplies. Inspect supplies for deterioration and improper functioning. If you answered No, then: If the supplies are low, or in poor condition, restock or repair Overfill Alarm Test alarm in accordance with manufacturer's Y/N (if present) specifications. Audible alarm should sound if present.

Consult manual, contact manufacturer or UST contractor.

If you answered No, then:

## **Chapter 9. Resources and References**

#### A. Contact Information

North Carolina Department of Environmental Quality (NCDEQ)
 Division of Waste Management – Underground Storage Tank Section

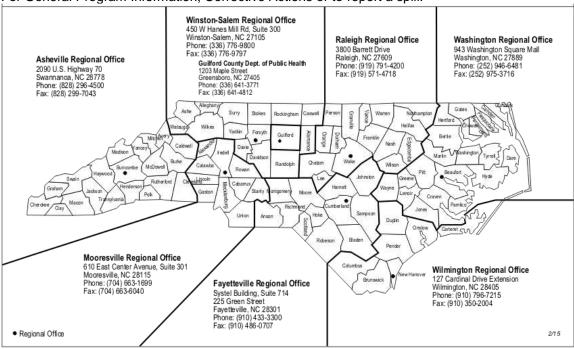
For Technical Information, State Regulations and Requirements and General Program Information contact the UST Central Office:

NCDEQ-UST Section 1646 Mail Service Center Raleigh, NC 27699-1646 919-707-8171 (phone) 919-715-1117 (fax)

http://www.wastenotnc.org

#### 2. NCDEQ - UST Section Regional UST Offices

For General Program Information, Corrective Actions or to report a spill:



#### 3. U.S. Environmental Protection Agency

For information on the Federal UST program: U.S. EPA/OSWER/OUST

1200 Pennsylvania Avenue, N.W. Mailcode: 5401G

Washington, DC 20460

#### **B.** Recommended Reading

## 1. Publications From the North Carolina Department of Environment and Natural Resources - Underground Storage Tank Section

The following publications are available from NCDEQ. You can obtain these documents a number of ways:

Phone: Call 919-707-8171

Internet: http://www.wastenotnc.org

#### a. North Carolina UST Regulations

• Title 15A North Carolina Administrative Code (NCAC) Subchapter 2N: "Criteria and Standards Applicable to Underground Storage Tanks"

#### b. Release Detection

#### Leak Detection Methods for Petroleum Underground Storage Tanks and Piping

Explains regulatory requirements for leak detection and briefly describes allowable leak detection methods.

Manual Tank Gauging For Small Underground Storage Tanks
 Booklet provides simple, step-by-step directions for conducting manual tank
 gauging for tanks 2,000 gallons or smaller. Contains record keeping forms.

#### c. Other Publications

- Procedures for Sampling Water Supply Wells at Petroleum UST Facilities
- Guidelines For Site Checks, Tank Closure, and Initial Response and Abatement
- Financial Responsibility Manual

#### d. Brochures

- Farm Tanks
- Financial Responsibility Requirements for USTs
- Groundwater Monitoring
- Home Heating Oil USTs
- Interstitial Monitoring
- Leaking Petroleum Cleanup Funds
- Non-Regulated USTs
- Selecting an Environmental Consultant
- Siting and Secondary Containment Requirements for Underground Storage Tank Systems near Wells and Surface Waters
- Procedures for Placing UST Systems in Temporary Closure & Returning them to Service
- UST Installation
- UST Responsibilities for Owners and Operators
- Vapor Monitoring
- Alternative Fuel Storage Guidelines

#### 2. Publications From the Environmental Protection Agency

The following publications are free and available from the U.S. Environmental Protection Agency (EPA). You can obtain these documents a number of ways.

- Phone: Call 1-800-424-9346
- Fax-on-Demand: Dial 202-651-2098 on your fax to access the EPA fax-on-demand service to receive via fax over 220 UST documents.
- Internet: http://www.epa.gov/oust/pubs/index.htm

#### a. Release Detection

- Doing Inventory Control Right: For Underground Storage Tanks
   Booklet describes how owners and operators of USTs can use inventory control
   and periodic tightness testing to temporarily meet federal leak detection
   requirements. Contains recordkeeping forms (16 pages).
- Getting The Most Out Of Your Automatic Tank Gauging System
   Trifold leaflet provides UST owners and operators with a basic checklist they can
   use to make sure their automatic tank gauging systems work effectively and
   provide compliance with federal leak detection requirements.

## Introduction To Statistical Inventory Reconciliation: For Underground Storage Tanks

Booklet describes how Statistical Inventory Reconciliation (SIR) can meet federal leak detection requirements (12 pages).

#### List Of Leak Detection Evaluations For UST Systems

A summary of specifications, based on third-party certifications, for over 275 systems that detect leaks from USTs and their piping. Each summary provides information on such items as certified detectable leak rate/threshold, test period duration, product applicability, calibration requirements, restrictions on the use of the device, and so on. (Available on web only)

#### b. Other Documents

#### Catalog Of EPA Materials On USTs

An annotated list of UST materials, including ordering information. Most of the leaflets, booklets, videos, and software items listed provide UST owners and operators with information to help them comply with federal UST requirements (32 pages).

#### Musts For USTs: A Summary Of Federal Regulations For Underground Storage Tank Systems

Plain language summary of federal UST requirements for installation, release detection, spill, overfill, and corrosion protection, corrective action, closure, reporting and recordkeeping. Updated & revised 1995 (36 pages).

#### UST Systems: Inspecting And Maintaining Sumps And Spill Buckets – Practical Help And Checklist

Manual presents recommended inspection guidelines and best management practices for UST system sumps and spill buckets. Includes safety considerations; a general introduction to the kinds of sumps; basic maintenance procedures for sumps and spill buckets; and a sump and spill bucket inspection checklist (16 pages).

## Model Underground Storage Tank Environmental Results Program Workbook

Workbook, which states can modify to reflect their laws, helps improve owner and operator compliance with UST regulations. Contains general information about ERP; instructions on how to use the workbook; regulatory requirements, best management practices, and compliance checklists for USTs; and draft forms and worksheets in the appendices (164 pages). (Available on web only)

#### Closing Underground Storage Tanks: Brief Facts

Trifold leaflet presents "brief facts" on properly closing USTs in order to comply with federal closure requirements.

#### Underground Storage Tanks: Requirements And Options

Trifold leaflet alerts UST owners and operators who are "nonmarketers" (who do not sell stored petroleum) that they need either to find alternatives to managing their USTs or to make decisions about UST compliance.

- Dollars And Sense: Financial Responsibility Requirements For Underground Storage Tanks
  - Booklet summarizes the "financial responsibility" required of UST owners and operators (16 pages).
- List Of Known Insurance Providers For Underground Storage Tanks
   Provides UST owners and operators with a list of insurance providers who may
   be able to help them comply with financial responsibility requirements by
   providing suitable insurance mechanisms (12 pages). (Available on web only)
- Financing Underground Storage Tank Work: Federal And State Assistance Programs

Booklet identifies potential sources of financial assistance to cover the costs of upgrading, replacing, or closing an UST, or of cleaning up an UST release. Updated and revised March 1999 (23 pages).

#### C. Internet Resources

(Links to external servers do not imply any official NCDEQ endorsement of the opinions or ideas expressed therein, or guarantee the validity of the information provided.)

#### 1. Government Links

- US EPA Office of Underground Storage Tanks: www.epa.gov/oust
- NC Department of Environmental Quality, Underground Storage Tank Section: http://www.wastenotnc.org

#### 2. Association Links

- American Petroleum Institute (API): www.api.org
- American Society of Testing and Materials (ASTM): www.astm.org
- Association of State and Territorial Solid Waste Management Officials (ASTSWMO Tanks Subcommittee): www.astswmo.org/tanks.htm
- Assessment Systems Inc. (ASI): www.asisvcs.com
- New England Interstate Water Pollution Control Commission (NEIWPC): www.neiwpcc.org/educate.html
- National Association of Corrosion Engineers (NACE): www.nace.org
- National Fire Protection Association (NFPA): www.nfpa.org
- National Leak Prevention Association (NLPA): www.nlpa-online.org
- National Work Group On Leak Detection Evaluations: www.nwglde.org
- Petroleum Equipment Institute (PEI): www.peinet.org
- Steel Tank Institute (STI): www.steeltank.com
- Underwriter's Laboratory (UL): www.ul.com

## **Chapter 10. Glossary**

Note: Words and phrases in italics are defined elsewhere in this glossary.

#### A

**ACT-100** / **ACT-100**U refers to a national standard detailing fabrication standards for steel tanks clad in a fiberglass reinforced plastic or polyurethane coating. See *composite tank*.

ALLD - See automatic line leak detector

**American Petroleum Institute (API)** is one of several organizations that has developed codes of practice concerning the installation, maintenance, use, and performance standards of *underground storage tank* systems. [www.api.org].

American Society of Testing and Materials Standards (ASTM) is one of several organizations that has developed codes of practice concerning the installation, maintenance, use, and performance standards of *underground storage tank systems*. [www.astm.org].

**Ancillary equipment** means any devices including, but not limited to, such devices as piping, fittings, flanges, valves, and pumps used to distribute, meter or control the flow of regulated substances to and from an UST.

**Anode** is the positive electrode (or terminal) in an electrolytic system or circuit. See *sacrificial anode*.

**API** – See American Petroleum Institute.

**API 1631** refers to the *American Petroleum Institute*'s Recommended Practice 1631 "Interior Lining and Periodic Inspection of Underground Storage Tanks" which provides minimum recommendations for the interior lining of existing steel and fiberglass reinforced plastic underground tanks used to store petroleum-based motor fuels and middle distillates.

**ASTM** – See American Society of Testing and Materials Standards

ATG - See Automatic Tank Gauge

**Automatic line leak detector** (**ALLD**) is an electronic or mechanical device that continuously monitors pressurized piping systems for catastrophic *releases*. In the event that the ALLD detects a drop in pressure in the product delivery line that equates to a 3-gallon per hour (gph) or greater leak, the ALLD will either: restrict flow, shut flow off completely or sound an alarm. All pressurized piping systems are required to have ALLDs.

**Automatic Shutoff Device** refers to either of the following:

- 1) an *overfill prevention device* that automatically and completely stops the flow of product into an UST during a fuel delivery when the tank is no more than 95% full. See *Flapper valve*
- 2) an *automatic line leak detector* that completely shuts off the flow of product within the piping in the event of a catastrophic release

**Automatic tank gauge (ATG)** is a device, or collection of devices, used to detect *releases* or measure inventory in *USTs*. ATGs typically consist of two separate components; a probe installed into a port on top of the tank that automatically measures the level of product and a console box that tracks and displays the amount of product in the tank. A loss of product and/or gain of water within the UST will cause the console to alert the UST operator that the tank may be leaking. Many ATG consoles print out a record of daily inventories and leak tests. Standard ATGs require a certain amount of "down time" for the UST, when product is not being placed in it or dispensed from it, for the test to be run accurately. Continuous ATGs, on the other hand, take measurements throughout the day and do not have the same limitation when it comes to requiring "down time".

#### B

**Ball float valve** (also called a float vent valve) is a *overfill prevention device* that is installed at the vent pipe in the *tank* and restricts vapor flow in an *UST* as the *tank* gets close to being full. The ball float valve should be set at a depth which will restrict vapor flow out of the vent line during delivery at 90% of the *UST*'s capacity or 30 minutes prior to overfilling. (NOTE: Ball float valves are not an approved overfill prevention device for use on *UST*'s with either suction *piping* systems, or *co-axial vapor recovery* systems.)

#### $\mathbf{C}$

Cathode is the negative electrode (or terminal) in an electrolytic system or circuit. See sacrificial anode.

**Cathodic protection or cathodically protected** means a method of reducing or preventing *corrosion* of a metal surface by making that surface the cathode of an electrochemical cell.

**Cathodic protection tester** means a person who can demonstrate an understanding of the principles and measurements of all common types of cathodic protection systems as applied to metallic underground *tanks* and piping systems.

**CFR** – See Code of Federal Regulations

**Change in service** means a change in the substances stored in the *UST* system from a *regulated substance* to a non-regulated substance, without permanent closure of the *UST* system.

Clad tank - See Composite Tank

**Coaxial vapor recovery** is one of two forms of *Stage I vapor recovery*. In a coaxial vapor recovery system the fill pipe is set inside a slightly larger pipe, and while fuel is placed into the tank through the fill pipe, displaced vapors move back to the fuel truck through the space between the two pipes.

**Code of Federal Regulations (CFR)** are the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government. It is divided into 50 titles that represent broad areas subject to Federal regulation. The *UST* rules are in Title 40: "Protection of Environment".

Compartmentalized or compartment tank means a tank that has been sectioned into multiple compartments so that it can hold different products (e.g., regular unleaded, premium unleaded)

**Composite tank** means a tank that is constructed of steel with a layer of non-corrodible material, generally fiberglass reinforced plastic or polyurethane, bonded to its exterior.

**Contingency plan** means planned procedures for reporting, containing, removing, and cleaning up a *spill* or *leak*.

Corrosion means the deterioration of a metal resulting from a reaction with its environment.

**Corrosion expert** is a person recognized by NACE International (formerly the National Association of Corrosion Engineers) as a *corrosion* specialist, *cathodic protection* specialist, or a registered professional engineer experienced in *corrosion protection*.

**Corrosion protection** means a method of reducing or preventing corrosion of an *underground storage tank system* through *cathodic protection*, the application of protective coatings, or the use of a non-corroding material in its construction.

**CP** – See Cathodic protection

#### D

Day means any continuous 24 hour period.

**De minimis concentration** means that amount of a *regulated substance* which does not exceed one percent of the capacity of the *tank*, excluding the *piping* and vent lines.

**DEQ-** See North Carolina Department of Environmental Quality

**Discharge** means releasing, *spilling*, *leaking*, pumping, pouring, emitting, emptying, or dumping of *petroleum* products into the environment, whether intentional or unintentional.

**Dispenser** means the stand-alone unit used to accurately dispense product (e.g., gasoline), complete credit card transactions, etc. Sometimes dispensers are referred to as a "gas pumps", although technically only suction piping systems have the pump located within the dispenser.

**Dispenser sump** is a container located underneath or near a dispenser or self-contained suction pump that collects or contains *leaks*. Sumps are not meant to contain regulated substances for extended periods of time and all product should be expeditiously removed.

**Drop tube** refers to the pipe that is installed into the fill port of the tank. Drop tubes channel the product to within a foot of the bottom of the tank in an attempt to minimize the disturbance of product already in the tank. *Flapper valves*, if present, are installed in drop tubes.

**Dual-Point Vapor Recovery** is one of two forms of *Stage I vapor recovery*. In a dual-point vapor recovery system, fuel is placed into the tank through the fill pipe and displaced vapors move back to the fuel truck by a separate connection to the tank.

#### $\mathbf{E}$

ELLD - See Electronic Line Leak Detector

**Electronic line leak detection (ELLD)** is an electronic device that continuously monitors pressurized piping systems for releases. ELLDs usually monitor the pressure change in a pipe when the pump turns on or off. The pressure will change differently in a tight line than a leaking line. Electronic systems may be wired to the pump controls to shut off flow and/or wired to an alarm to alert the operator in the event of a leak. Most ELLDs are self-testing to ensure they will work when a leak is detected. Most ELLDs are able to perform the job of an ALLD, that is detect 3.0 gph leaks, as well as be able to perform 0.2 gph and 0.1 gph leak rate tests.

**Enhanced leak detection** is a combination of leak detection monitoring and well sampling that offers *UST system* owners an extended deadline to comply with "secondary containment" requirements for *UST systems* located in close proximity to water supply wells used for *human consumption* and certain surface waters.

**European suction** refers to a style of suction piping for *UST systems* that is defined as having:

- enough slope so that the product in the pipe can drain back into the tank when suction is released and
- has only one check valve, which is as close as possible beneath the pump in the dispenser

#### H

**Fiberglass reinforced plastic (FRP)** is a composite made from fiberglass reinforcement in a plastic (polymer) matrix. Both tanks and piping can be constructed out of FRP.

**Fill pipe** means the pipe where product is introduced into the *UST*.

**Financial responsibility** means that *UST* owners and operators must ensure, either through insurance or other approved method, that they have the financial resources to help pay for the costs of third-party liability and corrective actions caused by leaks or spills from an *UST system*.

**Flapper valve** is an *automatic shutoff device* installed in the *drop tube* of the *tank* and shuts off the flow of product into a *tank* as the *tank* gets close to being full. The flapper valve should be set at a depth which will shut off the flow of product into the *tank* during delivery at 95% of the *tank*'s capacity. Flapper valves are one form of *overfill prevention*.

**Flex connector** – See *flexible connector piping section* 

Flex piping – See *flexible piping* 

**Flexible connector piping section** is constructed of a synthetic tube (e.g., Teflon-coated fabric) that carries the product, and is surrounded by a woven stainless steel jacket. Flexible connector piping sections are often used to replace "swing joints" as a method of reducing pipe stress and provide flexibility near the transition points for underground piping connections at the *dispenser* and *tank*.

**Flexible piping** refers to *piping* that, unlike rigid piping (e.g., steel and *fiberglass reinforced plastic*), is flexible. Flexible piping is typically constructed of multiple layers of thermoplastic materials.

**FRP** - See *fiberglass reinforced plastic*.

#### G

**Groundwater monitoring** means a method of *release detection* where groundwater samples are collected from monitoring wells every 14 days and then checked for the presence of petroleum.

#### H

**Human consumption** includes, but is not limited to: drinking, bathing, showering, cooking, dishwashing, laundering and oral hygiene. Water for toilets or sinks is also considered human consumption.

#### Ι

**Impressed current** is a method of *corrosion protection* that employs a continuous external power supply to provide protective current to inhibit corrosion activity. Permanently installed anodes are connected to an AC/DC rectifier that forces the steel object to be protected to a cathodic or protective condition.

**Integrity assessment** refers to approved methods of assessing the integrity of *tanks*. Integrity assessments were required on all *tanks* installed before December 22, 1988 prior to upgrading them with corrosion protection to meet the 1998 federal upgrade requirements.

**Interior lining** – see *internal coating*.

**Internal coating** means a coating or lining of a non-corrodible material bonded firmly to the interior surface of a storage *tank* that does not chemically or physically degrade when in contact with the product stored therein. Many USTs have a coating applied to the interior of the tank to reduce corrosion and/or prevent the product from being in contact with the tank.

**Internally-lined tank** means a tank installed before December 22, 1988 that has been lined with an internal coating in accordance with *API 1631* or *NLPA 631*.

**Interstitial monitoring** is a method of *release detection* where an *interstitial space* is used to determine if an *UST* or piping system is leaking. For tanks, there are four typical ways that this is accomplished. The interstitial space, if empty, is monitored for the presence of product. The interstitial space, if filled with a monitoring fluid, is monitored for a gain or loss. The interstitial space, if under a pressure or vacuum, is monitored for a change in pressure. For double-walled piping, the interstitial space is typically monitored by sloping the piping so that any leak from the inner (primary) pipe will be contained by the outer (secondary) pipe and run back to a *sump* where it can be contained long enough to be detected.

**Interstitial space** is the space between the inner (primary) and outer (secondary) wall of a double-walled *UST* or double-walled piping system.

#### J

**Jacketed tank** means a double-walled UST with the inner wall being made out of steel and the outer wall being made out of a non-corrodable material such as fiberglass reinforced plastic or polyurethane. Unlike *composite tanks*, jacketed tanks have a gap, or *interstitial space*, between the inner and outer wall.

#### L

**Leak** means any loss of regulated substance from an underground storage tank system.

Leak detection – See release detection

**Lines** – See *piping*.

**Line-leak detector** (**LLD**) is a device used in *pressurized piping* systems to detect a *leak*. Line leak detectors are either mechanical or electronic in construction. See *automatic line leak detector*.

LTT – See line tightness test.

**Line tightness test (LTT)** is a test of the *piping* to determine whether or not it is leaking. LTT must be capable of detecting a 0.1 gallon per hour leak rate at one and one-half times the operating pressure of the piping system.

#### $\mathbf{M}$

**Manifolded tank systems** are *tanks* connected by piping that allow the *tank system* to function as a single *tank*. A typical manifolded *tank system* usually consists of two *tanks* connected by a siphon tube that permits the product in the *tanks* to be at the same level while product is being pumped out of only one *tank*.

Manual tank gauging (MTG) is a method of *release detection* that can only be used on *UST*s 2,000 gallons or smaller. Only tanks 550 gallons or smaller can use this method alone. *Tanks* from 551 to 2,000 gallons can use MTG only when combined with periodic *tank tightness testing*. The combined method of manual *tank* gauging and *tank* tightness testing is a TEMPORARY *release detection* method. You can use the combined method for 10 years after installation or upgrading of a *tank* installed before December 22, 1988 with corrosion protection and spill/overfill devices. After the 10 years you must use a permanent *monthly monitoring method* such as an *automatic tank gauge* or *interstitial monitoring*.

**Mechanical Line Leak Detector (MLLD)** refers to the mechanical version of an *Automatic Line Leak Detector* (ALLD).

MLLD - See Mechanical Line Leak Detector

**Monthly monitoring method** refers to *release detection* methods for *USTs*, performed on a monthly basis: See *release detection*.

MTG See Manual Tank Gauging

#### N

**NACE** (formerly known as National Association of Corrosion Engineers) is the recognized organization for setting the standards for establishing and maintaining corrosion protection of buried metallic structures. NACE also certifies qualified individuals as *corrosion experts* and as *cathodic protection testers*.

**National Leak Prevention Association (NLPA)** is one of several organizations that has developed codes of practice concerning the inspection, repair and lining of *underground storage tank systems*. [www.nlpa-online.org].

NCDEO - See North Carolina Department of Environmental Quality

NCDEQ-UST - See Underground storage tank section

NLPA - See National Leak Prevention Association

**NLPA 631** refers to the *National Leak Prevention Association*'s Standard 631 which provides minimum recommendations for the interior lining, repair and internal inspection of steel and fiberglass reinforced plastic USTs.

Non-regulated UST, when dealing with NCDEQ-UST, means an UST system that is exempt from Title 15A North Carolina Administrative Code Subchapter 2N (15A NCAC 2N) "Criteria and Standards Applicable to Underground Storage Tanks". Note: Just because a UST system may not be regulated by 15A NCAC 2N does not mean it isn't regulated by some other statutes, laws, etc. (e.g., Leaking Petroleum Underground Storage Tank Cleanup Funds Act, Clean Water Act, Resource Conservation and Recovery Act)

**North Carolina Department of Environmental Quality (NCDEQ)** is the governmental agency in North Carolina responsible for the preservation and protection of the environment. The *Underground Storage Tank Section* is a part of *NCDEO*.

#### O

**Overfill alarm** refers to an electrical device used to audibly and/or visually alert a fuel deliverer that the tank is nearing maximum capacity when it is being filled. See *overfill prevention*.

**Overfill prevention** refers to a mechanical device ("ball float" valves; "flapper" valves), electrical device (*overfill alarm*), or fill procedure system that is intended to prevent a *storage tank* from being overfilled.

**Oil-water separator** is a device for collecting and separating non-soluble, non-emulsified petroleum from water.

**Operator** means any person in control of, or having responsibility for, the daily operation of the UST system.

**Operating permit** – See *UST Permit* 

Out-of-service means that an *underground storage tank system* or portion thereof is not being operated.

**Overfill prevention device** is a mechanical device, electrical device, or fill procedure system that is intended to prevent a *storage tank* from being overfilled. See *ball float valve*; *flapper valve*; and *overfill alarm*.

**Owner** is (a) in the case of an *UST System* in use on November 8, 1984, or brought into use after that date, any person who owns an *UST system* used for storage, use, or dispensing of *regulated substances*; and (b) in the case of an *UST system* in use before November 8, 1984, but no longer in use on or after that date, any person who owned such *UST* immediately before the discontinuation of its use.

#### P

PEI - See Petroleum Equipment Institute

**Performance claim** (a.k.a. "third party" certification) is the written documentation detailing the conditions or limitations under which a specific *release detection* method or piece of release detection equipment can detect a release of *regulated substance* with a probability of detection of 0.95 and a probability of false alarm of 0.05.

**Permit** – See *UST Permit* 

**Petroleum Equipment Institute (PEI)** is one of several organizations that has developed codes of practice concerning the installation, maintenance, use, and performance standards of underground storage tank systems. [www.pei.org]

**Piping** means a hollow cylinder or tubular conduit that is constructed of non-earthen materials. Piping includes all valves, elbows, joints, flanges, and flexible connectors attached to a tank system through which *regulated substances* flow

**Precision leak detection test** is a test capable of detecting a *storage tank leak* as small as 0.1 gal/hr with a probability of detection of 0.95 or greater and a probability of false alarm of 0.05 or less, within a period of 24 hours, accounting for variables such as vapor pockets, thermal expansion of product, temperature stratification, groundwater level, evaporation, pressure and end deflection.

#### R

Regulated substance is (a) any substance defined in section 101(14) of the Comprehensive Environmental Response and Liability Act (CERCLA) of 1980 (but not including any substance regulated as a hazardous waste under subtitle C), and (b) petroleum, including crude oil or any fraction thereof that is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute). The term "regulated substance" includes, but is not limited to *petroleum* and petroleum-based substances comprised of a complex blend of hydrocarbons derived from crude oil through processes of separation, conversion, upgrading, and finishing, such as motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents, and used oils.

**Regulated UST**, when dealing with NCDEQ-UST, means an UST system that is subject to the requirements of Title 15A North Carolina Administrative Code Subchapter 2N (15A NCAC 2N) "Criteria and Standards Applicable to Underground Storage Tanks".

**Release** means any spilling, leaking, emitting, discharging, escaping, leaching or disposing from an UST into groundwater, surface water or subsurface soils.

**Release detection** is a device or method that is capable of detecting *leaks* in an *underground storage tank* system. Often times the term release detection is used interchangeably with *leak detection*.

**Release investigation** refers to the required investigation and confirmation of all *suspected releases* within seven days or another reasonable time period specified by *NCDEQ-UST*, using either a *system test*, *site check* or another procedure approved by *NCDEQ-UST*:

#### S

**Sacrificial anode** is an anode attached to a metal object, such as an underground *tank*, to inhibit the object's corrosion. The anode electrolytically decomposes while the metal object remains free of damage.

**Safe suction** – see *European suction* 

**Secondary containment** is a method of release detection for *UST* systems that consists of double-walled *UST system*(s) with *interstitial monitoring*.

**Semi-volatile organic compounds** (SVOCs) may be roughly defined as organic compounds with a boiling point above about 220°C. The term "organic" indicates that these compounds contain carbon. Laboratory analysis of samples that detect SVOCs is indicative of the presence of the heavier, less refined petroleum substances such as heating oil, kerosene and diesel fuels.

**SIR** – see statistical inventory reconciliation

**Site check** refers to measuring for the presence of a *release* where contamination is most likely to be present at the *UST* site. In selecting sample types, sample locations, and measurement methods, *owners* and *operators* must consider the nature of the stored substance, the type of initial alarm or cause of suspicion, the type of backfill, the depth of ground water, and other factors for identifying the presence or source of the *release*. If the test results for the excavation zone or the *UST* site indicate that a *release* has occurred, *owners* and *operators* must begin corrective action. If the test results for the excavation zone or *UST* site do not indicate that a release has occurred, further investigation is not required. Procedures for a site check are contained in the most recent version of the UST Section's "Guidelines for Site Checks, Tank Closure, and Initial Response and Abatement".

**Sludge** means the *petroleum* product residue or material that accumulates at the bottom of a *storage tank*.

**Spill** means any loss of a regulated substance onto the ground from an aboveground portion of the *UST system* or from product delivery.

**Spill bucket** – See spill containment device

**Spill containment device** means a container fitted to the *fill pipe* of a *storage tank* or to the suction coupling of a *used oil storage tank* that helps prevent spills from entering the environment.

**Stage I vapor recovery** is used during the refueling of gasoline storage tanks to reduce hydrocarbon emissions. Gasoline vapors in the tank, which are displaced by the incoming gasoline, are routed through a hose into the fuel truck, instead of being vented to the atmosphere. There are two types of Stage I systems, dual point and coaxial.

**Stage II vapor recovery** is used during the refueling of vehicles to reduce hydrocarbon emissions. Gasoline vapors in the vehicle's fuel tank, which are displaced by the incoming gasoline, are routed through a specially-designed connector on the nozzle and back into the UST, instead of being vented to the atmosphere.

**Statistical Inventory Reconciliation (SIR)** means a method of *release detection* where a trained professional uses sophisticated computer software to conduct a statistical analysis of inventory, delivery, and dispensing data to determine whether or not the tank and/or piping is leaking.

**STI** – See Steel Tank Institute.

**Steel/FRP Tank** – See *composite tank* 

**Steel Tank Institute (STI)** is one of several organizations that has developed codes of practice concerning the installation, maintenance, use, and performance standards of underground storage tank systems. [www.steeltank.com/]

**Sti-P3** means a *UST* design developed by the *Steel Tank Institute* that employs factory-installed sacrificial anodes, a durable dielectric coating and bushings that isolate the *UST* from any other metal component, such as *piping* or *ancillary equipment*.

**Storage tank** means a closed container for the storage of *petroleum* with a capacity of more than 110 gallons that is designed to be installed in a fixed location.

**STP** – See *submersible turbine pump*.

**Submersible turbine pump** (STP) is a fuel pump located in an *UST* that forces the fuel, under pressure through the piping system to the dispenser.

**Sump** means a below grade area that allows access to equipment such as pumps, valves, piping. If containment sumps are installed they can also serve to catch and temporarily hold drips and spills of *regulated substances*. Containment sumps are not meant to routinely contain *regulated substances*. Sumps are most often found beneath *dispensers*; around *submersible turbine pumps*; at fill ports; and at piping transitions.

Suspected release means any of the following:

- The discovery by *owners*, *operators* or others of evidence of *released regulated substances* at the *UST* site or in the surrounding area (such as the presence of free product or vapors in soils, basements, sewer and utility lines, and nearby surface water, or
- Unusual operating conditions observed by *owners* and *operators* unless system equipment is found to be defective but not leaking, and is immediately repaired or replaced, ("unusual operating conditions" include, but are not limited to, the erratic behavior of dispensing equipment; the unexplained presence of water in the *tank*; the presence of fuel in containment sumps or interstitial spaces; or the degradation of any equipment or element of an *underground storage tank system* to the point where that equipment or element can not reasonably be expected to perform its intended function.), or
- Monitoring results from an approved release detection method indicates that a *release* may have occurred unless:
  - The monitoring device is found to be defective, and is immediately repaired, recalibrated, or replaced, and additional monitoring does not confirm the initial result; or
  - In the case of inventory control, a second month of data does not confirm the initial result.

**SVOCs** – see *semi-volatile organic compounds*.

**System test** refers to *tank tightness tests* and/or *line tightness tests* conducted to determine whether a leak exists in that portion of the *tank* that routinely contains product, or the attached delivery *piping*, or both.

- Owners and operators must repair or replace the UST system, and begin corrective action if the test results for the system, tank or delivery piping indicate that a leak exists.
- Further investigation is not required if the test results for the system, *tank* or delivery piping do not indicate that a leak exists and if environmental contamination is not the basis for suspecting the release.

#### T

**Tank** means a stationary device designed to contain an accumulation of *regulated substances* and constructed of non-earthen materials (e.g., concrete, steel, plastic) that provides structural support.

**Tank bottom water** means water that accumulates at the bottom of a *storage tank*.

**Tank tightness test (TTT)** is a test of the *tank* to determine whether or not it is leaking. TTT must be capable of detecting a 0.1 gallon per hour leak rate from any portion of the *tank* that routinely contains product while accounting for the effects of thermal expansion or contraction of product, vapor pockets, *tank* deformation, evaporation or condensation, and the location of the water table. TTTs are often two separate tests: one test that evaluates the wetted portion of the *UST* and another test that evaluates the dry, or *ullage*, portion of the *UST*.

#### **Temporarily closed** means:

- An *UST system* from which product has been removed such that not more than one inch of product and residue are present in any portion of the *tank*; or
- Any UST system in use as of December 22, 1998 which complies with the provisions of 15A NCAC 2N .0801

**Third party certification** – See *Performance Claim*.

**Tightness testing** refers to the act of performing a *tank tightness test* or *line tightness test* depending on what specific component is being referred to.

TTT see tank tightness test.

#### IJ

**Ullage** means the un-wetted portion of the *tank*, i.e. that portion of the *tank* that does not contain *petroleum* product.

**UL** see *Underwriters Laboratories*.

**Underwriters Laboratories (UL)** is one of several organizations that has developed codes of practice concerning the installation, maintenance, use, and performance standards of underground storage tank systems. [www.ul.com]

**Underground storage tank (UST)** means any one or combination of *tanks* (including underground piping connected thereto) that is used to contain an accumulation of *regulated substances*, and the volume of which (including the volume of underground pipes connected thereto) is 10 percent or more beneath the surface of the ground. This term does not include any:

- Farm or residential tank of 1,100 gallons or less capacity used for storing motor fuel for noncommercial purposes; or
- Tank used for storing heating oil for consumptive use on the premises where stored; or
- Septic tank; or
- Pipeline facility (including gathering lines) regulated under:
- The Natural Gas Pipeline Safety Act of 1968 (49 U.S.C. App. 1671 et seq.), or
- The Hazardous Liquid Pipeline Safety Act of 1979 (49 U.S.C. App. 2001 et seq.), or
- Which is an intrastate pipeline facility regulated under state laws comparable to the provisions of the Natural Gas Pipeline Safety Act of 1968 (49 U.S.C. App. 1671 et seq.) or the Hazardous Liquid Pipeline Safety Act of 1979 (49 U.S.C. App. 2001 et seq.).; or
- Surface impoundment, pit, pond, or lagoon; or
- Storm-water or wastewater collection system; or
- Flow-through process tank; or
- Liquid trap or associated gathering lines directly related to oil or gas production and gathering operations; or
- Storage *tank* situated in an underground area (such as a basement, cellar, mineworking, drift, shaft or tunnel) if the storage *tank* is situated upon or above the surface of the floor.

**Underground Storage Tank Section** is the governmental agency in North Carolina that issues permits, collects annual fees and handles requests for information for regulated and /or commercial underground storage tanks. The Section ensures compliance with all relevant state and federal laws, policies, rules and regulations by assisting owners and operators in complying with operational standards (release detection, spill and overfill prevention, etc.). This Section oversees the administration of several Trust Funds for the reimbursement of cleanup costs associated with UST releases. This section also oversees the permanent closure of UST systems, as well as, assessment and cleanup of any releases.

**Underground storage tank system** means an *underground storage tank*, including all underground *piping* and ancillary equipment and containment systems, if any.

**UST** – See *Underground storage tank* 

**UST permit** refers to the annual operating permit required in order to place product into an *UST*. *Owners* and *operators* are required to obtain an UST permit annually for each facility at which an *UST* is located. The specific requirements for applying for a permit are <u>all</u> of the following:

- Annual tank fees
- Proof of *tank* ownership

- Tank registration
- Tank compliance
- Proof of financial responsibility

**UST system** – See *Underground storage tank system*.

#### $\mathbf{V}$

**Vapor monitoring** means a method of *release detection* where vapor samples are collected from monitoring wells every 14 days and then checked for the presence of petroleum vapor.

**Vent** means an opening in an *underground storage tank system* that is specifically designed to relieve excess internal pressure or vacuum within an *underground storage tank system*.

**Volatile organic compounds (VOCs)** are chemicals that evaporate easily at room temperature. The term "organic" indicates that the compounds contain carbon. VOCs may be roughly defined as organic compounds with a boiling point below about 220°C. Laboratory analysis of samples that detect VOCs is indicative of the presence of the lighter, more refined petroleum substances such as gasoline and solvents.

**VOCs** – see *volatile organic compounds*.